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TWO NORTHEASTERN ALLIES OF SALIX LUCIDA.

M. L. Fernald.

Salix lucida, with its lustrous foliage and closely flowered golden-yellow staminate aments, is one of the handsomest and easiest recognized of New England willows. As it ordinarily occurs in eastern America the species is a large shrub, but occasionally, when undisturbed, it develops into a small tree twenty-five feet high, with trunks even six inches in diameter. Through the greater portion of its range the species is, for a willow, very constant in its characters; but during the past few years the fact has been more than once impressed upon the writer that in extreme northeastern New England and adjacent Canada *Salix lucida* gradually becomes notably different from the typical shrub, while on the western borders of New England occurs a beautiful shrub so unlike *S. lucida* in many characteristics that by some who know it it has been taken for quite another species.

True *Salix lucida* has the leaves glossy and green on both surfaces, glabrous or glabrate, though when very young bearing some crisp early-deciduous colored hairs. Its mature leaves taper to very elongate (caudate) usually curved tips, while in general outline the leaf varies from lanceolate to ovate.

The variation of *Salix lucida* which is characteristic of extreme northeastern New England and adjacent Quebec and New Brunswick was first detected by Messrs. Emile F. Williams and J. Franklin Collins in 1900, although the plant, with its peculiarity unnoticed, for two years had lain in the writer's herbarium. The material first collected by Messrs. Williams and Collins was from a fine tree at Fort Kent, Maine; and during the summer of 1901 additional speci-

mens from the same source were secured by Mr. Williams, Dr. B. L. Robinson, and the writer. The foliage of the Fort Kent tree was very long for *S. lucida* and the under surfaces of the leaves, especially along the veins, were pubescent with persistent rufous hairs. A comparison made by the writer of this material and an authentic sheet of Andersson's *S. lucida*, var. *macrophylla* led him to identify the Fort Kent tree with Andersson's variety from British Columbia. Subsequently, however, the pubescent-leaved extreme has been watched in northern Maine and Quebec, particularly upon the upper St. Francis where it abounds, and a more detailed examination shows that it cannot well be treated as identical with the British Columbian willow with which it was at first placed.

Salix lucida, var. *macrophylla*, as shown in the Gray Herbarium by a specimen of Lyall's from the Lower Frazer River, has the ample young leaves glaucous and glabrate beneath, though minutely pubescent on the midrib above, and it is apparently a phase of the extreme western *S. lasiandra*, Benth. The northern Maine willow which was once referred by the writer to *S. lucida*, var. *macrophylla*, proves upon further study to differ very constantly in having the leaves green and not glaucous beneath and permanently pubescent on the nerves beneath with sordid or rufescent hairs. This plant with permanent pubescence is found to vary in size from a small shrub of cold swamps, with mature leaves only 4 or 5 cm. long, to well developed trees of rich alluvium, with leaves often 15 cm. in length. Except in the abundance and permanence of the pubescence there seems no other character by which to separate the northern Maine willow from narrow-leaved forms of glabrous or early-glabrate *S. lucida*; but as a variety with marked geographic range it is worthy separation as

Salix lucida, Muhl., var. **intonsa**. Shrub or small tree, rarely becoming 7 or 8 m. high with trunk 1.3 dm. in diameter: branches of the first year pubescent with mostly permanent sordid or rufescent hairs: mature leaves elliptic-lanceolate, taper-pointed, 4 to 15 cm. long, 1 to 3.5 cm. broad, permanently pubescent, especially on the veins beneath.— *S. lucida*, var. *macrophylla*, Fernald, according to Williams, Rhodora, iii. 277, not Andersson.— By streams and in swamps, St. John River and tributaries, Maine, Quebec, and New Brunswick; Mattawamkeag River, Maine; and Restigouche River, New Brunswick. The following herbarium specimens have been

examined. MAINE, Beau Lac, St. Francis River, August 14, 1902 (*W. W. Eggleston & M. L. Fernald*); Fort Kent, July 22, 1900 (*J. F. Collins & E. F. Williams*), August 11, 1901 (*B. L. Robinson, E. F. Williams & M. L. Fernald*); Island Falls, July 9, 10, 1898 (*M. L. Fernald*, nos. 2452, 2453); NEW BRUNSWICK, Toms Island, Restigouche River, July 30, 1896 (*G. U. Hay*).

The other willow of New England, which, by some who have known it either in the field or the herbarium, has been reluctantly placed with *Salix lucida*, is a remarkable shrub with a varied history. The attention of New England botanists was directed to it in 1899, when Mr. Ralph Hoffmann reported from "a peat-bog in Stockbridge, Mass., a handsome willow, growing as a shrub fifteen feet or less in height"; with the additional notes that "the persistence, or late ripening of the fruit is particularly characteristic; a branch collected September 24, still retains its half opened capsules. The willow grows plentifully in beds of sphagnum, in company with *Betula pumila* L. and *Sarracenia purpurea* L. Mr. C. E. Faxon, who has kindly examined a branch, pronounces it *Salix amygdaloides*, Anders.,"[1] a species then unrecorded east of central New York.

On June 1, 1900, Mr. Hoffmann collected from the Stockbridge bog material in pistillate flower which has been deposited in the herbarium of the New England Botanical Club; and on May 31, 1902, in a deep larch-swamp among the Taconic Mountains, at Salisbury, Connecticut, scarcely twenty-five miles from the Stockbridge bog this handsome willow, in staminate flower, greatly perplexed Messrs. C. H. Bissell, J. R. Churchill, and the writer. In the Salisbury swamp, as at Stockbridge, the willow was associated with *Betula pumila*, while *Salix candida*, *Carex Schweinitzii*, *C. tetanica*, *C. teretiuscula*, var. *ramosa*, and other characteristic plants of the Taconic region were in this or adjacent swamps. At the time of collection the Salisbury shrub was not identified with the Stockbridge willow which had been taken for *Salix amygdaloides*; for, as the Salisbury shrub had the leaves lustrous-green above with gland-tipped petioles, and short-oblong staminate aments, it was temporarily placed with *S. lucida*. Unlike that species, however, which was in the neighborhood, the Salisbury willow had the leaves very pale or even whitened beneath, the character ordinarily relied upon

[1] RHODORA, i. 229.

to distinguish from the eastern *S. lucida* the extreme western *S. lasiandra*. Accordingly, in his recent account of the Salisbury excursion Mr. Bissell has suggested[1] the possibility that further observation may show the presence of *S. lasiandra* in eastern America.

In attempting to settle this problem Mr. Bissell has brought to the writer excellent fruited specimens of the Salisbury willow, which now proves to be quite the same as Mr. Hoffmann's Stockbridge shrub; while an examination of the Gray Herbarium shows the plant to extend southwestward to the mountains of northern New Jersey, and to reappear on Lakes Superior and Michigan; and some fragments from the Bebb Herbarium, generously furnished by Dr. C. F. Millspaugh of the Field Columbian Museum, show it to be also in western New York, northern Ohio and northern Minnesota. The suite of specimens now before him have encouraged the writer to make a detailed comparison of the shrub with the three species to which it has been variously referred, *Salix amygdaloides*, *S. lucida* and *S. lasiandra*, and from them all it proves to be abundantly distinct.

Aside from its firm thick elliptic-lanceolate finely crenulate-serrate leaves which in maturity are pale or whitened beneath and on gland-tipped petioles, the shrub is characterized in early summer by short-oblong dense staminate aments (1 to 1.5 cm. long, 1 to 1.2 cm. thick), the short peduncle, rachis, and short obovate pale straw colored entire scales, softly pubescent with white hairs; the pistillate aments rather loosely flowered, in anthesis 1.5 to 2.5 cm. long, with white-pilose oblong entire bluntish scales. But the most striking condition of the plant is in late September and October when the fruit is mature. Then, when the firm discolorous leaves are about to fall, the matured pistillate aments are 2 to 3.5 cm. long, 2 to 2.5 cm. thick. The spreading capsules are olive or bronze-tinged (rarely pale), thick-walled, conic-subulate in outline, 7 to 12 mm. long, and on thickish pedicels which are only twice as long as the tongue-shaped gland.

From all three species, *Salix amygdaloides*, *S. lucida*, and *S. lasiandra*, with which isolated specimens of this autumn-fruiting willow have been sometimes associated, it is quickly separated by three significant characters: its very late fruiting, the fruiting material at hand having been collected at dates from September 8 to October 9, while the fruited specimens in the Gray Herbarium of *S. amygda-*

[1] Rhodora, v. 34.

loides were collected from May 23 to June 26, of *S. lucida*, May 27 to June 25, of *S. lasiandra*, June 15 to July 7; its thick-walled, conic-subulate capsules which in maturity are 7 to 12 mm. long, the thinner-walled capsules of *S. amygdaloides* being conic-ovoid, 4 to 5 mm. long of *S. lucida* and of *S. lasiandra* narrowly conic-ovoid, 4.5 to 6.5 mm. long; and the thickish pedicels which are about twice as long as the gland, while in *S. lasiandra* the more slender pedicel is three times as long as the gland, in *S. amygdaloides* and *S. lucida* often four or five times as long.

From *Salix amygdaloides* the late-fruiting willow is further distinguished by its short thick aments and by the gland-tipped petioles; from *S. lucida*, as already stated, by its elliptic-lanceolate leaves which are acute or short-acuminate but rarely caudate-attenuate at tip, and pale or sometimes whitened beneath. In leaf-outline it is not unlike some forms of the western *S. lasiandra*, but in view of the three important distinctions already pointed out, the eastern shrub is hardly to be identified with that Cascade Mountain tree.

The only willow which in its conic-subulate capsule and gland-tipped petioles approaches the shrub is the European *Salix pentandra*, a tree which is occasionally cultivated but rarely established about towns from New England to Ohio. That tree, however, has oblong or ovate-oblong leaves, green on both surfaces, the flower-scales glabrous or at first pubescent at base with stiff straightish hairs; and the slightly shorter mature capsules, at least in the American form, subcordate instead of narrowed at base. Furthermore, as *S. pentandra* occurs in New England it matures and loses its fruit in midsummer.

A search through local floras of the regions from which this shrub of our inland sphagnous swamps is known, reveals several interesting notes, all emphasizing its leading characteristic — the late flowering and fruiting. Thus, in Dudley's Cayuga Flora we find: "**S. lucida**, Muhl., var. ——— with beautiful shining, coriaceous, very finely serrate leaves, larger, light-brown pods, and flowers and fruits very much later than in the type, occurs in the Round-Marshes. I have also collected it in Bergen Swamp, N.Y., from which place Mr. Bebb has received it, as well as sparingly from N. J., Ohio, and Mich. Flowers from June 10–30 and matures fruits slowly, the writer obtaining pods still in excellent condition, Sept. 9, 1880."[1] [In the same district

[1] Dudley, Cayuga Flora (1886) 87.

Prof. Dudley found *S. lucida* flowering "May 20–30."] In the Report on Botanical Work in Minnesota for the year 1886, the shrub, though meagrely described, was treated with more assurance as "**Salix lucida** Muhl., var. **serissima** Bailey (*n. var.*). Differs from the species in fruiting very late. It occurrs at Lansing, Mich., where its fruit matures in September, assuming a bright red color in the sun. It is one of the most ornamental of the willows. B 357, Mud river; in fruit."[1] Two years later, Dr. N. L. Britton, noting from northern New Jersey stations for supposed *S. lucida*, said: "In Sussex county this willow holds its fertile catkins until late in September."[2] And, again in 1896, in the account of Plants of Monroe County, New York, and adjacent Territory, Misses Beckwith and Macauley recorded "**S. lucida**, Muhl., var. ——— ? In Bergen Swamp. Flowers June 10–30; fruit last of Aug. to Sept."[3]

That the observations of Messrs. Hoffmann, Bissell, and others in western New England are borne out by these records is very obvious. Furthermore, examination of material of Prof. Dudley's Cayuga shrub and of the original numbered plant from Minnesota and the Lansing (Michigan) material of Bailey's *Salix lucida*, var. *serissima* shows that those plants are quite like the shrub of the Berkshire and Taconic swamps; while one of the specimens first identified with the material from western New England was a finely fruited branch from a swamp in Sussex county, New Jersey.

The late-flowering and fruiting shrub with long thick-walled capsules appears, then, as specially emphasized in the comparisons on a preceding page, to be quite distinct from other willows of the *Pentandrae*; and the name first applied to it when Prof. Bailey considered it a variety of *S. lucida* recognizes its most obvious characteristic. Its characters and known history may be briefly summarized as follows.

Salix **serissima**. Shrub, sometimes 4 m. high; the branches covered with olive-brown lustrous bark, branchlets brown or yellow-tinged, glabrous, lustrous: leaves elliptic-lanceolate, or on young shoots sometimes oblong-lanceolate, acute or short-acuminate, in maturity dark shining green above with a broad whitish midrib, pale or whitened beneath, thick and firm, 4 to 8 (on sterile young shoots

[1] Bailey in Arthur, Geol. & Nat. Hist. Surv. Minn., Bull. no. 3 (1887) 19.

[2] Britton, Cat. Pl. N. J. (1889) 226.

[3] Beckwith & Macauley, Proc. Rochester Acad. Sci. iii. (1896) 103.

even 10 or 11) cm. long, 1 to 3.5 cm. broad, closely and finely glandular-serrulate; the slender lustrous petioles tipped by 1 to 3 pairs of glands: winter buds lance-oblong, 5 to 7 mm. long, olive-brown or castaneous, lustrous: aments on short white-pilose peduncles, terminating short leafy branches: the staminate ament short-oblong, 1 to 1.5 cm. long, 1 to 1.2 cm. thick, the rachis white-pilose; scales short-obovate, entire, pale straw-color, white-pilose; filaments loosely hairy at base: pistillate aments loosely flowered, in anthesis narrowly oblong, 1.5 to 2.5 cm. long, with white-pilose oblong entire bluntish scales; style evident; stigmas 2, thick, 2-lobed; mature ament 2 to 3.5 cm. long, 2 to 2.5 cm. thick, the spreading-ascending mostly olive or brown-tinged thick-walled lustrous conic-subulate capsules 7 to 12 mm. long, their thickish pedicels 1 to 2 mm. long, twice exceeding the oblong-lingulate gland.— *S. lucida*, var., Dudley, Cayuga Fl. (1886) 87. *S. lucida*, var. *serissima*, Bailey in Arthur, Geol. & Nat. Hist. Surv. Minn., Bull. no. 3 (1887) 19. *S. lucida*, in part, Britton, Cat. Pl. N. J. (1889) 226. *S. lucida*, var.?, Beckwith & Macauley, Proc. Rochester Acad. Sci. iii. (1896) 103. *S. amygdaloides*, C. E. Faxon according to R. Hoffmann, RHODORA, i (1899) 229, not Andersson. *S. sp.*, C. H. Bissell, RHODORA, v. (1903) 33.— In deep sphagnous bogs or larch-swamps, from the Housatonic Valley, Massachusetts, to the north shore of Lake superior, south to Morris Co., New Jersey, western New York, northern Ohio, Michigan, Wisconsin and Minnesota, flowering from late May to late June or early July, the fruit mature from late August to October. MASSACHUSETTS, peat-bog, Stockbridge, September 24, 1899, June 1, 1900 (*Ralph Hoffmann*): CONNECTICUT, larch-swamps, border of Twin Lakes, Salisbury, October 9, 1901 (*C. H. Bissell*, no. 5511), May 31, 1902 (*C. H. Bissell & J. R. Churchill*), near State Line, Salisbury, May 31, 1902 (*C. H. Bissell, J. R. Churchill, & M. L. Fernald*), Sept. 22, 1903 (*C. H. Bissell*): NEW JERSEY, margin of pond near Sparta, Sussex Co., September, 1867 (*C. F. Austin*); Budd's Lake, Morris Co., August 6, 1869 (*T. C. Porter*— Field Columbian Museum, no. 2804): NEW YORK, Round-Marshes, McLean (*W. R. Dudley*— Field Col. Mus., no. 5904); Buffalo (*G. W. Clinton*— Field Col. Mus., nos. 4370, 4372): OHIO, Painesville, Lake Co., 1871 (*H. C. Beardslee*— Field Col. Mus., no. 7106); Ashland Co., July 11, 1899 (*Selby & Boyd*, no. 1488 — Field Col. Mus., no. 103208): ONTARIO, Pic River, Lake Superior (*Loring*): MICHIGAN, Flint, 1871 (*D. Clarke*— Field Col. Mus., nos. 2426, 2427); Lansing (*L. H. Bailey* — Field Col. Mus., no. 6401); Jackson, Sept. 8, 1893 (*S. H. & D. R. Camp*— Field Col. Mus. no. 2709): WISCONSIN, Milwaukee (old specimen, presumably from Lapham, in Gray Herb.): MINNESOTA, Mud River, Vermillion Lake, July 28, 1886 (*Arthur, Bailey, & Holway*, no. B 357 — Field Col. Mus., no. 6390).

The stations from which we know *Salix serissima* suggest that it

should be looked for at other points in New England and New York. Its occurrence with *Betula pumila*, *Salix candida*, *Carex Schweinitzii*, and other characteristic swamp plants of the Berkshire and Taconic Mountain region, indicates that it may be sought with some confidence in Bennington County, Vermont, and with real assurance in Dutchess and Columbia Counties, New York. In fact, the junction of these two counties of New York with Litchfield County, Connecticut, is at the base of Mount Riga, just north of the State Line swamp where *Salix serissima* was first studied by the writer. Larch swamps to all appearances the same extend westward from northern Litchfield County nearly to the Hudson Valley, and are characterized[1] by *Betula pumila*, *Salix candida*, *Valeriana sylvatica*, *Viburnum Opulus*, *Cypripedium spectabile*, *Carex Schweinitzii*, *C. tetanica*, *C. teretiuscula*, var. *ramosa*, etc., all of which with the exception of *Valeriana* (abundant only three miles west of Salisbury) are among the typical plants of the Stockbridge or the Salisbury marshes; while many of them occur with *Salix serissima* in the swamps of northern New Jersey, in the famous Bergen Swamp of Genesee County, New York, or in the marshes near Cayuga Lake. It will, then, be indeed surprising if an exploration of similar tracts fails to reveal in eastern New York, as in western Massachusetts, northwestern Connecticut, northern New Jersey, and northwestern New York, *Salix serissima* as a companion of these notable species.

Gray Herbarium.

NOTES ON NEW ENGLAND VIOLETS.

E. Brainerd.

(Plate 50.)

A most noteworthy instance of the segregation of an old species is to be found in the recent treatment of the common blue violet. The polymorphous group of plants included in the last edition of the Gray Manual under *Viola palmata* and its var. *cucullata*, it is now proposed to divide up into at least thirty species.

This radical treatment of a common and familiar plant, though not

[1] See L. H. Hoysradt, Bull. Torr. Cl. VI. appendix.

without precedent, naturally challenges our attention and criticism. Even an amateur student of botany may be tempted to scrutinize the facts that appear in his limited field of observation. That the reader may understand upon what data the present article is based, the writer may perhaps be pardoned for saying, that for the past two seasons his botanical field work from May to October has been almost entirely devoted to this genus, that he has collected and examined some two or three thousand plants from over two hundred stations in Western Vermont and Western Massachusetts, and that much of his material has been examined and discussed by expert students of the genus. His purpose is to put on record certain facts of observation that may prove of interest, and to give the results of his study as to specific limitations.

I desire to express herewith my grateful appreciation of the courtesies and assistance that I have received in the course of my studies from Mr. C. L. Pollard of the National Museum, from Prof. Greene of the Catholic University, and from Dr. Robinson of the Gray Herbarium. I am also under great obligation to numerous friends for the use of valuable material from many localities.

It is only in recent years that students of our violets have paid attention to the development of the plant during the summer months. In the Synoptical Flora (1895) the specific characters are taken almost exclusively from the plants as they appear when flowering in Spring, though the existence of later cleistogamous flowers, "abundant and short peduncled," is stated. Even Mr. Pollard, who has distinctly urged the importance of studying the mature plant, is, in his treatment of Viola in the recent Manuals of Dr. Britton and of Dr. Small, quite vague in his account of the apetalous flowers and their mature capsules. Yet right here are to be found the most marked and constant characters on which to divide the acaulescent blue violets into species. These plants are best understood, as are the Cruciferae and Umbelliferae, *when in fruit.*

This is indeed what might have been expected from certain well known biological laws. In the evolution of species the most marked differences are found to appear when the individual has reached the climax of its life-history. The young of allied species are more alike than the adults. An herbaceous plant in its vernal state, even though in flower, has often less pronounced characters than when in summer or autumn it has attained its full size and produced its seed. "By their fruits ye shall know them."

It may be well here to rehearse briefly the methods of reproductive economy that prevail in those species of Viola that have neither stems nor stolons. The petaliferous flowers that appear in May have a special mechanism that ensures cross-fertilization. They are believed to be sterile unless visited by insects with pollen from another flower. Their infertility has been often observed, especially in foreign gardens, from which doubtless the requisite insects were absent. But in the wild I have, during the past season, found these capsules to be usually fertile. It takes three or four weeks from the time of flowering for the capsule to ripen its seeds. It then splits into three boat-shaped valves with very thick rigid keels. As the thin sides of the valve dry and contract, the seeds within are more and more pinched, until they fly out, one or two at a time, to a distance of several feet. (See Rhodora, iv. 183 & 230.)

Soon after petaliferous flowering, the plant begins to produce from the crown of the rootstock minute, apetalous, self-fertilized flowers on peduncles that are short and horizontal, or long and ascending, according, for the most part, as the plant grows in a dry or in a wet situation. But in all cases as the capsule ripens, the peduncle lengthens; and the effort of the plant is to lift the capsule into the air, and to raise it from a nodding to an erect position, after which it opens and scatters its seeds, as did the earlier capsules. When thickly covered with dead leaves the blanched peduncles are often six or more inches in length, and may never succeed in getting the ripe capsules up into the air. But I certainly have never discovered in the "cleistogenes" any "tendency to bury themselves deep in the ground instead of remaining close to the surface," such as Mr. Pollard attributes to *V. domestica*, Bicknell. (Bot. Gaz. xxvi, 337.) The mature capsules of all species are normally "aerial" and not "hypogaeous."

A vigorous plant under favorable circumstances, especially in the open, will continue to bear fruit from cleistogamous flowers from July till the last of October. The cool wet weather of last August was specially favorable for all species of violets, and they bore abundant fruit in the autumn. The capsules of the apetalous flowers usually differ somewhat in appearance from those of the petaliferous flowers. They have this advantage for purposes of study that they may be had at almost any time during a period of three or four months. It is upon differences that are found in the apetalous flowers and their

capsules — differences in shape, size, color, in form of sepals and of auricles — that I believe specific distinctions in the acaulescent violets can be most satisfactorily based. These characters prove to be fairly constant; they seem to have no "biological importance," and so are not subject to "adaptive changes," and have, therefore (to use Dr. Gray's terms once more), "high classificatory value."

That the importance of these characters has hitherto escaped attention seems strange; but it may be accounted for by two facts. First, the plants are most attractive when in vernal flowering; if fruit and mature leaves are wanted, most collectors have been satisfied to collect the plants a month later, before they are injured by the drought and insects of summer but before the apetalous capsules are mature. Secondly, the capsules of the apetalous flowers, even when but half-grown, split open on drying, and the sepals shrivel, so that their characters in ordinary herbarium specimens are greatly obscured.

I present herewith a synopsis of the New England species of acaulescent, non-stoloniferous violets, with the omission of *Viola pedata*, which, since it has beardless petals and a peculiar style, Dr. Gray has placed in a group by itself.

A. Apetalous flowers subulate; their mature capsules bright green, oblong, acute, 5–15 mm. long; sepals on mature capsules lanceolate, nearly as long as the capsules; with straight auricles 2–5 mm. long. (Pl. 50, fig. 1.)

1. V. CUCULLATA, Ait. Plant usually glabrous; leaves broadly cordate-ovate; petaliferous flowers blue varying to white, often with a darker blue center; peduncles longer than the leaves; — springs, cold brooks and bogs, and moist soil of mountains.

B. Apetalous flowers ovoid-acuminate; their mature capsules purple, subglobose, mostly obtuse, 4–8 mm. long; sepals on mature capsules one half as long as the capsules, with short appressed glabrous auricles. (Pl. 50, fig. 2.)

2. V. VENUSTULA, Greene. Plants small, glabrous throughout; leaves ovate-acuminate, 2–5 cm. wide; petals blue; peduncles about as long as the leaves; — moist, mucky borders of streams, marshes and lakes.

C. Apetalous flowers ovoid-acuminate; their mature capsules pale green, or more or less speckled with purple, oblong, acute or acutish, 8–15 mm. long; sepals one quarter to one third as long as the capsule, with short appressed commonly hispidulous auricles. (Pl. 50, fig. 3 & 4.)

* Leaves never lobed, broadly ovate or reniform, 4–12 cm. wide.

† Plants essentially glabrous; petals violet.

3. V. LATIUSCULA, Greene. Leaf-outline above the cordate base approximately deltoid, earliest leaves purplish on the under surface, petioles puberulent or slightly pubescent; — dry copses in sandy or sterile soil.

4. V. PAPILIONACEA, Pursh. Leaf-outline above the cordate base broadly orbicular, earliest leaves green on the under surface, petioles usually glabrous; — rich moist soil, often in yards and cultivated ground.

† † Plants more or less villous-pubescent; petals light blue or lavender.

5. V. SORORIA, Willd. Moist rich woodlands, shady ledges, meadows and pastures.

* * Some or all of the leaves palmately divided or lobed.

† Plants more or less villous-pubescent; petals light blue.

6. V. PALMATA, L. Dry open woods and ledges.

† † Plants nearly or quite glabrous; petals bright blue.

7. V. SEPTEMLOBA, LeConte. Sandy soil near the coast.

D. Apetalous flowers sagittate on horizontal or deflexed peduncles; their mature capsules purple, subglobose, 4–6 mm. long; sepals somewhat obtuse and ciliolate, with long divergent auricles. (Pl. 50, fig. 5.)

8. V. SEPTENTRIONALIS, Greene. Plants pubescent or subglabrous; earliest leaves purplish on the lower surface; mature leaves ciliate, broadly ovate, 3–7 cm. wide; petioles slender, wiry, often purple at base; petals violet, with sepals closely ciliolate nearly to the tip; — dry or moist copses.

E. Apetalous flowers sagittate on erect peduncles; their mature capsules green, ovoid or oblong, 6–14 mm. long; sepals lanceolate with long hispidulous auricles. (Pl. 50, fig. 6.)

* Leaves pubescent, ovate-oblong, petioles usually shorter than the blades; petals violet-purple.

9. V. FIMBRIATULA, J. E. Smith. Dry soil.

* * Leaves nearly glabrous, lanceolate, basal lobes spreading toothed or incised, petioles usually longer than the blades; petals deep violet.

10. V. SAGITTATA, Ait. Wet meadows and marshes.

I subjoin a few comments on each of these ten species.

1. *Viola cucullata*, Ait., is beautifully distinct. Prof. Greene was the first to call attention to its distinctness in Dec. 1896. (Pittonia, iii. 143 & 336.) There is, however, still some uncertainty as to whether this was the plant that Aiton had before him when he gave the name in 1789. Prof. Greene now regards the group as separable into about ten species, and names much of the Vermont material *V. prionosepala.*

The specific name — *cucullata* — is not especially appropriate except to plants that grow in open bogs; those that grow in the shade have leaves as widely spread as those of any other species. All violet leaves are involute in the bud. When expanding they have the shape of a monk's hood, the basal lobes being rolled in so as to touch each other; and when full grown, if evaporation is excessive, they all tend to revert to this natal condition. If a violet specimen is not soon put in press after it is collected, the basal lobes

will roll inward, and even the mature leaves will appear cucullate when dried. In the field I believe this character is of doubtful value; in the dried specimen it is often misleading.

Viola cucullata, more than any of its allies, affects a cold situation. It thrives near perennial springs and along cold brooks. It is the common violet of mountain regions, where it is often found on wood-roads and along highways.

This species is omitted from Dr. Small's recently published Flora of the Southern States. But there is in the Gray Herbarium a specimen of it, collected in the mountains of North Carolina by Rugel, October 1841. It has petaliferous flowers that differ from those of spring in having sepals with long auricles, such as regularly appear in the apetalous flowers. For this reason Shuttleworth considered Rugel's plant a distinct species. But numerous specimens from several localities in Western Vermont show that *Viola cucullata* not infrequently has petaliferous flowers in autumn, and that these as a rule have long-auricled sepals. A period of mild, springlike weather in autumn often causes the appearance of vernal flowers. It is as though under this impulse the life-forces of the violet got confused, and mixed the characters of its two kinds of flowers. The *V. macrotis* and the *V. leptosepala* of Greene also remind one of this "long-eared" form, which might occasionally occur in spring as well as in autumn.

2. *V. venustula*, Greene, is notably the smallest plant of the group. The type is from the vicinity of Ottawa, Ont., but the species is of frequent occurrence at low elevations in the Champlain Valley. Probably when understood the species will be found to have a much wider distribution.[1]

Under division "C" we have a natural group of five species or subspecies, in which the details of flower and fruit are much alike. They are separable from one another chiefly by features that appear in the foliage — pubescence and lobation — characters which are obvious enough when fully developed, but inconstant and intergrading. In the most pronounced form of *V. palmata* the leaf is 5–7-parted; but plants with 3–5-lobed leaves (var. *dilatata*, Ell.) are perhaps more common; and growing with these are plants with

[1] I have recently seen specimens collected by Messrs. Bissell and Andrews at Lakeville in the northwest corner of Connecticut, and specimens from Willoughby Mt. collected by Mr. Eggleston.

one or more entire leaves, and still other plants with all the leaves entire. It is extremely difficult to make out how these last differ from *V. sororia.* The situation is quite the same when we consider the character of pubescence. We find specimens of *V. sororia* with dense, almost matted, pubescence on the petioles, others with sparse spreading pubescence, others with mere traces of pubescence just below the blade, and this on only one or two leaves, and finally other plants quite glabrous. Somewhere in this shifting series we pass from *V. sororia* to *V. papilionacea.* In several other species of Viola we find pubescence just as variable a character. *V. blanda* is sometimes quite pubescent, but often nearly or wholly glabrous; so is *V. rotundifolia*; so is *V. renifolia.* Under these circumstances it would seem that in the genus Viola, whatever may be the case elsewhere, pubescence, unless correlated with other characters, is not a satisfactory basis on which to found a species. Possibly these correlated characters may yet appear. Meanwhile, as I am loth to make new names or new combinations, I provisionally speak of these five forms under division "C" as species.

3. *V. latiuscula*, Greene (Pittonia, v. 93, Nov. 1902), was founded upon specimens from Twin Mts., West Rutland, Vermont. The plant proves to be of frequent occurrence in dry sterile soil in western New England and adjacent New York. It was collected by the writer in May, 1899, on the dry open sand-plains near Fort Ethan Allen, Essex, Vermont. On revisiting the station for mature leaves and fruit in June, 1903, after over fifty days of rainless weather, I found that the plant had completely disappeared. But on a third visit, September 11, after a rainy August, large plants in abundance bearing copious fruit were to be had. The plant had become as completely dormant during the summer drought as during the winter cold. Further facts tend to show that certain species of stemless violet are capable of leading a double existence, passing, with intervals of rest between, through a vernal and an autumnal stage that differ from each other in foliage, flower and fruit,— thus posing as a sort of Jekyll and Hyde among plants.[1]

[1] *Viola rotundifolia*, Michx. well illustrates this; there is a marked contrast between the April plant with its small leaves and yellow flowers, and the August plant with its large leaves and chocolate cleistogamous flowers on branching peduncles (really, disguised stolons). Pursh described the latter form as a distinct species, *V. clandestina*; though he opined its connection with Michaux's species. But for this opinion he was taken to task by Schweinitz, who stoutly asserts that *V. rotundifolia* "can have *no affinity whatever*" with *V. clandestina!* (Am. Jour. Sci. v. 63.)

4. *V. papilionacea*, Pursh, is the name taken up in recent years by Messrs. Greene and Pollard for the common purple-flowered violet of meadows and orchards, including the form found frequently in door-yards and borders of streets (*V. domestica*, Bicknell). In New England the species is more frequently seen within fifty miles of the coast than farther inland. In habitat and general aspect it seems quite distinct from its near ally, *V. latiuscula*. But when one attempts to state the difference, as in the above synopsis, the marks of distinctness are found to be elusive,— if not illusory.

5. *V. sororia*, Willd. The colored plate that accompanies the original publication of this species represents the petioles as erect and edged with sparse spreading hairs. This is a peculiarity of the plants to which we apply the name, and there can be no reasonable doubt as to its applicability. Dr. Britton so understands the species in the Illustrated Flora (ii. 448). It is the commonest of all violets in the Champlain Valley and occurs in various situations. In wet mucky woodlands its leaves are not infrequently 40 cm. high and 15 cm. wide; in the hollows of open pastures and on sparsely wooded hillsides its leaves are usually but 7–10 cm. high and 5–7 cm. wide. In the latter situation it fruits in autumn far more abundantly than in the former.

I have included under *V. sororia*, several of Prof. Greene's species, especially his *V. cuspidata*, *V. Dicksonii*, and *V. nodosa*,— confessing my inability to make out any other than trifling or local differences between them. In Pittonia (v. 103) Prof. Greene has called attention to a singular feature that he has observed in *V. Dicksonii*: — the occurrence of underground fruit "converted into what appears to be a berry. It is evidently globose (as large as an ordinary wild gooseberry, or middle-sized pea), absolutely indehiscent, the pressed and dried pericarp being unbroken, translucent and showing the seeds that lie within, just as, in the herbarium, the seeds of many a berry-like fruit are seen through their fleshy covering in its dried state." This is but a malformation of the capsule due to the sting of a gall-fly. A dissection of the "baccate fruit" in August shows the presence of the scarlet larvae of a species of this sort of insect. We find that at least four other species of Viola — *V. palmata*, *V. venustula*, *V. cucullata* and *V. septentrionalis* — are attacked in the same way, though with less frequency.

6. *V. palmata*, L., has been found in Vermont in only a few

stations from the middle of the State south along the western border, and only in the form bearing leaves with 3–5 shallow lobes. The form with deeply divided leaves I have collected as far north as Great Barrington, Mass.

7. *V. septemloba*, Le Conte, is in New England confined to the costal regions. I include under this name *V. Brittoniana*, Pollard, which I cannot regard as specifically distinct from the plant of Le Conte.

8. *V. septentrionalis*, Greene (Pitt. iii. 334). This admirable species was founded upon specimens collected by J. M. Macoun near Ottawa, Ont., in May and June, 1898. Several sheets of this collection are in the Gray Herbarium. Prof. Greene has recently made several other species, from different localities, out of what seems to be essentially the same thing as the Ottawa plant. *V. septentrionalis* he now regards as a local species, and calls the plants sent from Vermont, *V. subviscosa*. Believing as I do in their specific identity I am obliged to use Prof. Greene's oldest name,— a name, by the way, as felicitous for this northern species, as the other name is infelicitous, the plant being never in the least viscous.

At the time of vernal flowering the species might be confused with *V. sororia*, both having cordate-ovate pubescent leaves; but one soon learns to distinguish it by the rich violet of the petals and the purple coloring on the lower surface of its earliest leaves. These marks, indeed, after a few months fade out in herbarium specimens. But here I find a fairly reliable mark in the fine ciliation of the sepals extending nearly or quite to the tip. In *V. sororia* the sepals are obscurely ciliate and that chiefly at the base. When, however, one examines *V. septentrionalis* in late summer, it is seen to be more closely related to *V. fimbriatula* than to any other species. This resemblance is seen in the pubescence, in the color of the petals, in the form of the apetalous flowers and fruit, and in the ciliation and long auricles of the sepals. Nevertheless there are obvious and radical points of difference between the two species, and no one would think of merging them into one.

The species is a common one in the northern New England States. Mr. Eggleston has collected it on the cold cliffs of Smugglers' Notch. I have seen it from numerous stations in Maine and New Hampshire. Mr. Bissell has it from at least two stations in Connecticut. I have collected it in Lanesboro, Mass. In western

Vermont it is frequently found in partial shade on gravelly hillsides. It especially affects the company of young conifers, and thrives in the open groves of arbor-vitae that abound on the rocky shores of Lake Champlain.

9. *V. fimbriatula*, J. E. Smith, has been separated of late years by general consent from *V. sagittata*, and is too well known to call for special comment.

10. *V. sagittata*, Ait., has not been found in Vermont or in the Berkshire Hills. In New England it seems to be for the most part restricted to the neighborhood of the coast.

Some may query whether these closely allied species are ever found to hybridize under natural conditions. It often happens that colonies of two species are growing intermixed, and it would not be strange if occasionally a crossing should be effected in the petaliferous flowers through the agency of insects. I am aware that evidence of such crossing should be weighed with great caution and verified in all possible ways; but an important phase of this report would be omitted if I failed to state that in three instances I have found plants that had every appearance of being hybrids. One of these that I have watched for two seasons, is in flower, fruit and foliage a striking intermediate between *V. fimbriatula* and *V. sororia*; the second is an intermediate between *V. cucullata* and *V. venustula*; and the third, an intermediate between *V. septentrionalis* and *V. venustula*. In all instances the supposed parents were near at hand and numerous. Mr. Pollard, who has seen flowering specimens of the first mentioned hybrid, was inclined to regard it rather as a new species; and so it may be — possibly. But I fancy that more than one of the many new species recently proposed, based on plants from a single station, seen only in petaliferous flower, may prove on more extended observation to be hybrids. This interbreeding may, indeed, be more extensive than we have supposed, and be one of the causes of the perplexity that has attended the study of these interesting plants.

Middlebury College, Middlebury, Vermont.

THE PSEUDO-MONOCLINISM OF CHIONANTHUS VIRGINICA.

Alfred Rehder.

Some years ago *Chionanthus virginica*, which though not native to New England is often cultivated for its ornamental qualities, attracted my attention by some peculiarities in its fruiting and flowering. I noticed that the shrubs in bloom presented noticeable differences in their appearance and that some shrubs bore fruit abundantly, while others had no fruit at all. An examination of the flowers of several shrubs showed some difference in their structure and as I could not remember any notice of it in botanical literature, I decided to make a closer investigation. I examined carefully the flowers of all the shrubs of the species growing in the Arnold Aboretum, of which 14 were planted in one group together, while one shrub was standing solitary some distance away from that group. I marked them all with numbers and took notes on the structure of the flowers of each one of the shrubs; besides those I observed two shrubs standing solitary in private gardens. As the chief difference between the flowers I found that one part had well developed stigmas and smaller anthers which did not open, but fell off still closed with the fading corolla, while others had a rudimentary stigma, though the ovary and the style seemed to be normal, and larger anthers shedding pollen freely; occasionally, however, I found among the first kind of flowers a few anthers which opened and discharged their pollen. Only four plants of all those observed belonged to the second kind and these four plants, as I found in comparing again my notes with the plants, when the fruits were ripening, bore not a single fruit, though all other shrubs surrounding them were loaded with fruits. The three solitary plants, which all belonged to the first kind, had only a few fruits; a small part of the flowers apparently had been fertilized by the occasionally appearing fertile anthers; the number of fruiting panicles in these plants was comparatively small and each panicle bore only 1 to 3, rarely more fruits, while the shrubs in the group mentioned above, which were growing side by side with pollen-bearing plants, had a very large

number of fruiting panicles and each one bore from 5 to 12 and occasionally even to 20 fruits.

The chief differences which show, however, intergradations between the staminate and the pistillate flowers, as they may be called, though the latter are not perfectly monoclinous, are the following —

Pistillate flowers: calyx with ovate to lance-ovate sepals, shorter than or as long as the style, petals generally smaller and narrower, usually about 20 mm. long; filaments elongated, about half as long as the anthers, these narrower, distinctly apiculate, exceeding the corolla tube, the anther-cells remaining closed; pistil with well developed stigma (fig. 2).

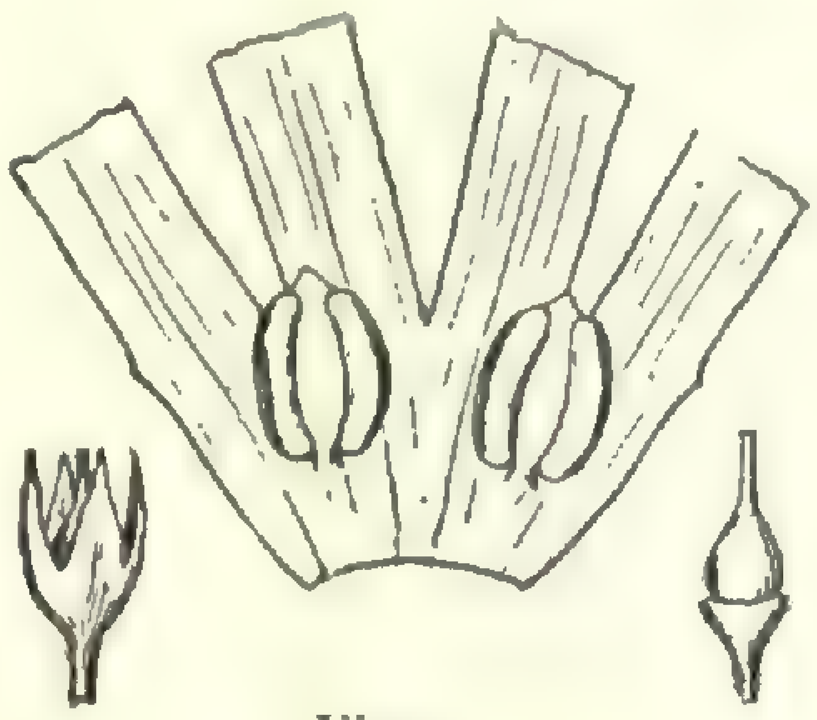


Fig. 1.

Staminate flowers: calyx with lanceolate sepals, longer than the style, petals generally longer and broader, attaining 28 mm. in length, stamens occasionally 3 or 4, filaments very short, anthers short-apiculate, 1.5–2 mm. long, not or slightly exceeding the corolla tube; pistil somewhat smaller with imperfectly developed stigma (fig. 1).

Fig. 2.

The ovary of the staminate plant, though somewhat slenderer, hardly differs from that of the pistillate plant and contains apparently well developed ovules. The anthers of the pistillate flowers also have the appearance of normal anthers, though somewhat narrower, and are filled with numerous pollen cells, but these differ from the normal ones in being somewhat smaller and nearly subglobose and I could not distinguish the granular structure of the extine which can be observed in the normal ovoid anther cells.

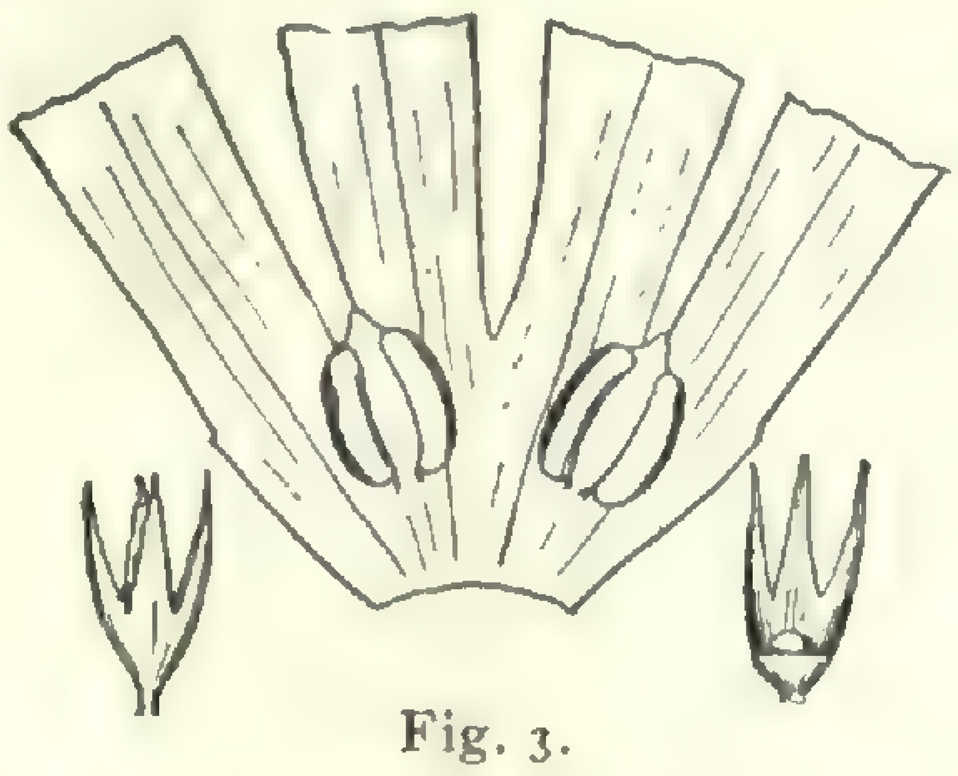


Fig. 3.

The panicles of the staminate plants are usually larger and more floriferous, and as the individual flowers have generally longer and broader petals, the staminate plants are more showy in bloom and therefore superior as an ornamental plant.

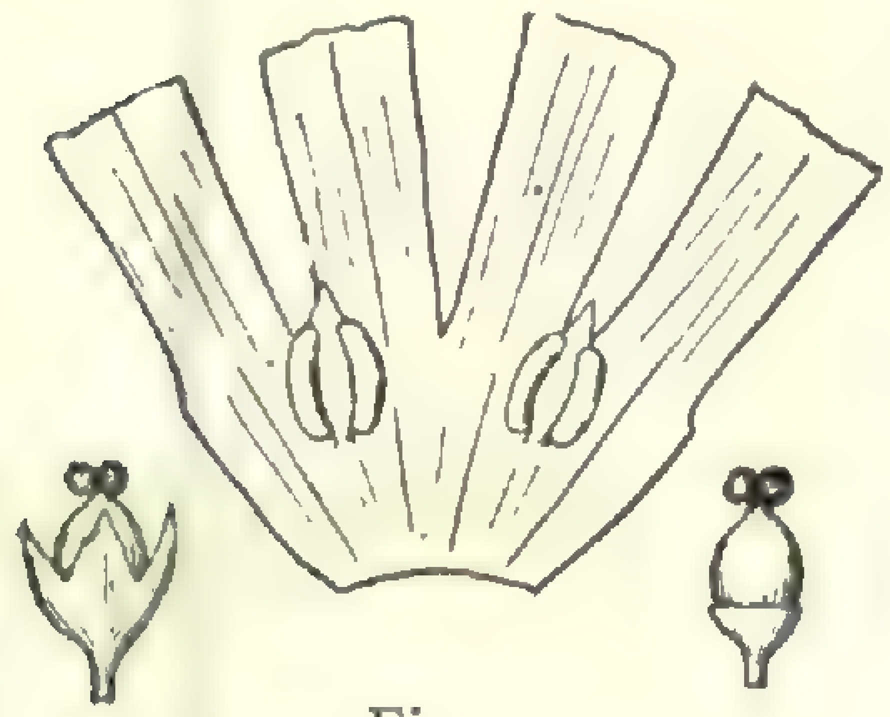


Fig. 4.

In the second species of the genus, *Chionanthus retusa*, Lindley &

Paxton,[1] the polygamy was observed by Maximowicz; the differences in this species are much more pronounced, because in the staminate flower the pistil is reduced to a small subglobose body, otherwise they are of the same character, as the accompanying illustrations (fig. 3 and 4) show. Also the anthers in the pistillate flowers seem to remain closed as far as can be judged from herbarium specimens.

In the literature of systematic botany I failed to find any reference to the polygamy of *Chionanthus virginica*; in the generic descriptions which include *C. retusa* the genus is characterized as having perfect or polygamous flowers, while *C. virginica* is always described with perfect flowers. The polygamy, however, has been observed before and the first notice of it I found in the Horticulturist of 1857 (12 : 266), where Th. Meehan in an article on trees and shrubs with ornamental fruits makes the following remarks about the Fringe-tree: "Many trees do not bear and others imperfectly . . . . for though it is classed . . . . with the perfect flowering plants, it is in reality polygamous, as much so as the Ash." A similar statement in an unsigned note, probably also by Th. Meehan, appeared in the Gardeners' Monthly of 1885, (**27** : 228). Two years later Meehan[2] gives a short account of his observations on the polygamy in *Chionanthus virginica*, accompanied by two figures showing the different styles, and he remarks that Gray notes in "the later edition of his Manual" that Chionanthus is occasionally polygamous. I could, however, find no allusion to it in Gray's Manual nor in any of the more recent American floras, and it seemed to me therefore not useless to draw again attention to the fact that the flowers in *Chionanthus virginica* are not monoclinous, but are, what probably would be the best term for it, andro-dioecious, though they could be called perhaps as well imperfectly dioecious. These terms will apply to the whole genus, for there is no real difference between the two species in this respect, only the Asiatic species represents a more advanced state of dioecism.

Arnold Arboretum.

[1] Brit. Fl. Gard. **3**: 85, f. 273 (1853).

C. chinensis, Maximowicz, Bull. Ac. Sci. St. Petersb. **20**: 430; Mél. Biol. **3**: 393 (1874).

[2] Proceed. Acad. Nat. Sci. Philad. 1887 : 280 (1888).

SOME NOTES ON GALIUM.

K. M. Wiegand.

In my previous paper on the genus Galium[1] several varieties of *Galium tinctorium* were described among which was the variety Labradoricum, and the range there given was "In sphagnous bogs Connecticut, New York and Wisconsin northward to Labrador. Since that time Mr. M. L. Fernald has generously supplied me with fruiting specimens and has called my attention to the fact that this form is really a distinct species, quite different in many respects from *Galium tinctorium*. Observations made during the past summer have fully convinced me of the correctness of his view, and it seems, therefore, desirable to raise this variety to specific rank as follows.

Galium **Labradoricum** sp. nov. (*C. tinctorium Labradoricum* Wiegand Bull. Torr. Bot. Club **24**; 398, 1897.) Low and erect, or ascending and more diffuse if in shady places, 1–4 dm. high, moderately stout: stem 4-angled, nearly or quite smooth: early in the season somewhat bushy branched, but later through the elongation of erect branches appearing often nearly simple: internodes 1–4 times the length of the leaves: leaves mostly in fours, 5–13 mm. long, oblong-linear, rounded at the apex, cuneate at the base, glabrous except the aculeolate margins, dull above, usually more or less reflexed: flowers very few in groups of 2–6 on short terminal peduncles which later become stout and apparently lateral: pedicels short, mostly reflexed in fruit, 1–3 fld.: corolla large 2–3 mm in diam. white, lobes 4, acute: fruit small, glabrous; carpels 1.25 mm. diam. usually but one developing: endosperm a hollow sphere.

Sphagnous bogs and arbor vitae swamps, Connecticut, New York and Wisconsin northward to Labrador.

Specimens studied; — Oswego Co., New York, *Rowlee & Wiegand* 1895 (type, in herb. Cornell Univ.); Connecticut (Torr. Herb.): New York (Torr. Herb.): Wisconsin (*Lapham*); Lake Superior (*Loring*); Maine (Aroostook Co., *Fernald*); Newfoundland (*Waghorne*, 1893); Labrador (*Storer*).

This species grows quite generally throughout the sphagnous bogs of northeastern North America and seems confined to such localities, while *G. tinctorium* grows normally in ordinary swamps or

[1] Galium trifidum and its North American Allies. Bull. Torr. Bot. Club **24**; 389, 1897.

marshes and is a more southern plant. It differs from *G. tinctorium* in the fruit which is only one-half as large, the carpels of the latter species being 2.25–3 mm. in diameter, in the position of the fruit on short stout apparently lateral branches, and in the more reflexed leaves which are of equal breadth throughout or slightly spatulate, but not with a tendency toward the lanceolate form as in *G. tinctorium*. But it is similar to the latter species in the smooth stem, sparsity of flowers, 4-parted acute-lobed corolla and fruit maturing usually but one carpel, and in the hollow spherical endosperm.

Cornell University, Ithaca, New York.

A Newly Introduced Galium.— Last summer in the latter part of June, while wandering through a low, swampy meadow at Norfolk, Conn., I chanced upon a small clump of yellow Galium.

At first sight I thought the plant was the yellow bedstraw that is occasionally found in this region, *G. verum*, L., and wondered that it should blossom a month earlier than usual and choose such soil, as before I had always found it in dry, sandy fields. Upon closer inspection I was convinced that this clump was not *G. verum*. The plants were more slender with fewer and larger flowers, while the flower clusters were shorter and more scattered upon the stem. Being unable to find any description of it, a specimen was sent to the Gray Herbarium where it was determined as *G. praecox*, Lang in Hagenbach's Flora Basiliensis Supplement, 26 (1843). The Norfolk plant was compared with specimen no. 2222 "Flora Exsiccata Austro-Hungarica" and was also matched with specimens from Deidesheim collected by Schultz Bipontinus and labeled *G. Wirtgeni*, Schultz, the latter name appearing to be a synonym for *G. praecox*, Lang. Our plant is a native of Central Europe and this, so far as known, is the first report of its introduction into New England. — Mary C. Seymour, Norfolk, Connecticut.

Plants New to the Flora of New Bedford. — In a dumping ground on the outskirts of New Bedford I found in June a colony of about a dozen plants bearing diminutive, white, umbellate flowers. It was necessary to revisit the locality later to obtain fruited specimens essential in determining the species, which proved to be *Coriandrum*

sativum, Willd. Coriander is cultivated in England, and the seeds, which are aromatic, are used for seasoning and in some forms of confectionery. Its occurrence here may be traced perhaps to its use, by the English operatives in our cotton mills. *Centaurea vochinensis*, Bernh.. a pretty composite flower, was found in both of the neighboring towns of Dartmouth and Westport. *Hypochaeris radicata*, L. mentioned in an early number of RHODORA as found at Wood's Hole grows in great abundance in and about one of our public parks. It resembles greatly the Fall Dandelion, *Leontodon autumnalis*, and is already a troublesome weed and difficult to eradicate. Another rare weed found for the first time in this locality is *Camelina microcarpa*, *Andrz.* I am indebted to Mr. M. L. Fernald for his valuable assistance in determining these uncommon plants. — E. WILLIAMS HERVEY, New Bedford, Massachusetts.

NOTES ON PUBLICATION RECENTLY RECEIVED.

IN his popular work on the ferns [1] of the Northeastern States Dr. C. E. Waters has told with great clearness and in excellent literary style practically all that most amateurs will wish to know about the Filices and Ophioglossaceae of our flora. The book is profusely illustrated by fine half-tone reproductions of very cleverly taken and well selected photographs, exhibiting all phases and features of fern life from massed individuals in the natural habitat to microscopic details of the sporangia.

Mr. Alfred Rehder has recently published an admirable synopsis of the genus Lonicera. This paper, which forms the pièce de resistance in the 14th Report of the Missouri Botanical Garden, is the outcome of a patient and exceedingly detailed examination of a large genus, the difficulties of which are from the chiefly Asiatic distribution of the species little realized by most American botanists. Mr. Rehder enumerates 154 good species, together with a great number of varieties, forms, hybrids, and doubtful species. Synonymy, bibliography, and copious citation of herbarium specimens are added in great detail.

[1] Ferns, a Manual for the Northeastern States, with analytical keys based on the stalks and on the fructifications, by C. E. Waters, Ph. D. of Johns Hopkins University. New York, Henry Holt & Co., 4to, 362 pp.

The paper is unique in recent American literature in dealing so exhaustively with a large and complicated group of plants chiefly of Old World distribution. The specific delimitation of our New England species is but little modified by Mr. Rehder's treatment, although there are some necessary nomenclatorial changes from the usage of Gray's Manual, thus *L. ciliata*, Muhl., is made to give way to the earlier *L. canadensis*, Marsh., and *L. glauca*, Hill, to *L. dioica*, L. The paper is illustrated by twenty plates. Although it was not found practicable to publish specific descriptions in the synopsis, the running keys are so complete that the lack of the characterizations will scarcely be felt. Throughout the work is critical and scholarly.

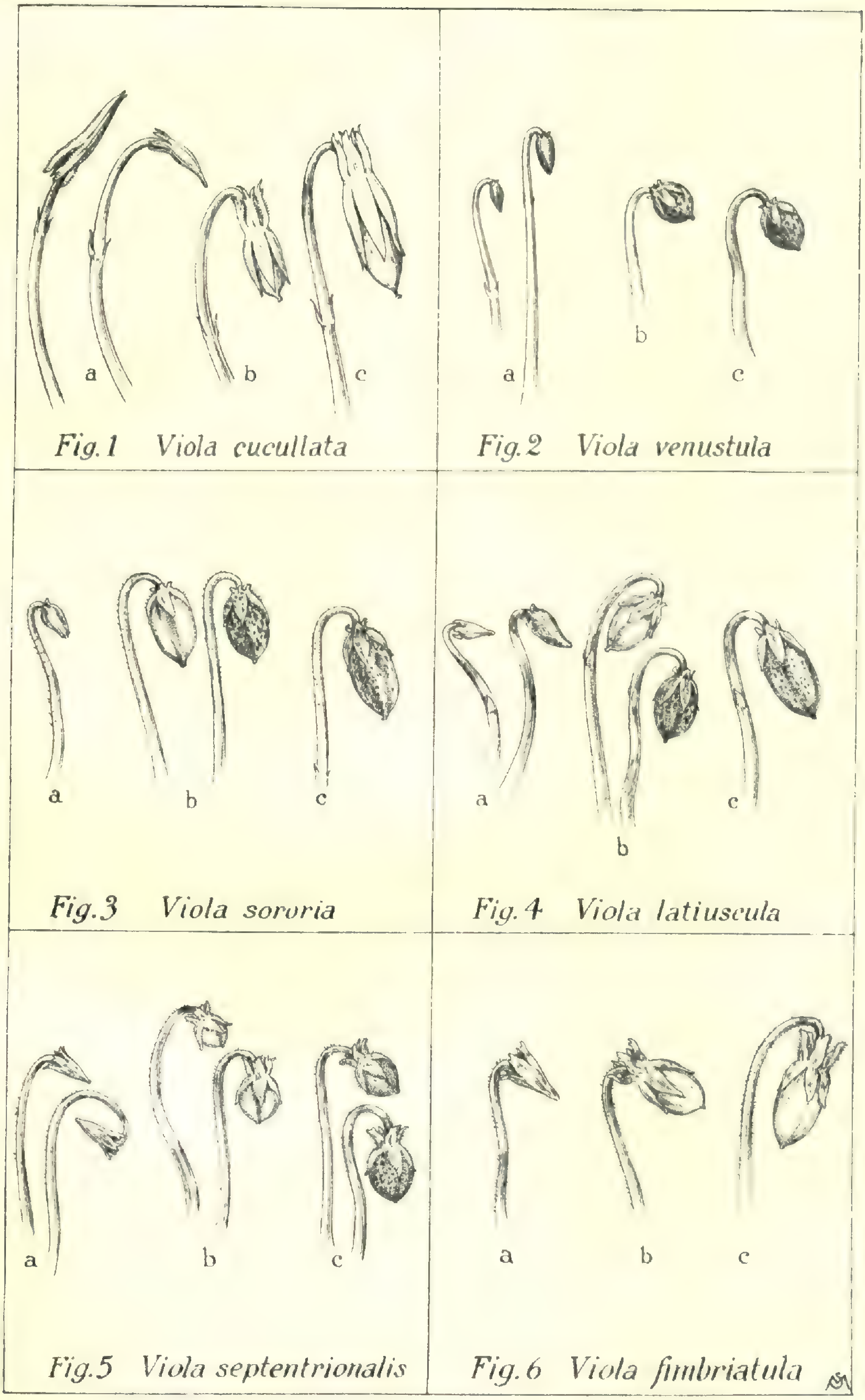
Mr. Alexander Wallace has just published an attractive and readable book on the heather.[1] Although dealing primarily with the folklore and romance of his subject the author has taken great pains to bring together the existing scientific records of the habits and distribution of the heather both in Europe and America. Among many pleasing illustrations there is an excellent portrait of Boston's distinguished horticulturist, Mr. Jackson Dawson, and a reproduction of "Vanity Fair's cartoon of the Flower Committee of the Massachusetts Horticultural Society searching for the Heather at Tewksbury,"—features which alone are worth the price of the book.

The most gigantic enterprise in recent systematic botany, the Pflanzenreich, a collaborative work being prepared under the energetic editorship of Professor Engler and designed to include specific as well as generic descriptions of all known plants, is making excellent progress. The latest issues include monographic treatments of the *Scheuchzeriaceae*, *Alismataceae*, and *Butomaceae* all by Professor Franz Buchenau, the *Lythraceae* by Professor E. Koehne, and *Taxaceae* by Dr. R. Pilger.

Mr. Theodor Holm has published in the Ottawa Naturalist, xvii. 149–160, some well illustrated Biological Notes on Canadian Species of Viola, a paper which will be found interesting by New England students of the genus. Mr. Holm groups the species according to peculiarities of the rhizone.

[1] The heather in Lore, Lyric and Lay, by Alexander Wallace, editor of the Florist's Exchange. New York, De la Mare Publishing Co. 8vo, 245 pp.

Vol. 5, no. 60, including pages 281 to 308, plate 49, and title page of volume 5, was issued December 22, 1903.



F. Schuyler Mathews del.

CLEISTOGAMOUS FLOWERS AND FRUITS OF VIOLA.

Charles Christopher Frost.

(1805–1880.)

Rhodora

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RECOLLECTIONS OF CHARLES CHRISTOPHER FROST.

ELIZABETH B. DAVENPORT.

(With portrait.)

(Read at the Eighth Annual Meeting of the Vermont Botanical Club.)

THE recent transfer of the valued herbarium of Mr. C. C. Frost to the University of Vermont makes it fitting at this time and place that something should be said regarding the personal history of this keen but modest botanist. I have been asked to tell you what I have known of him during many years' residence in Brattleboro, where he lived and worked.

To-day the world is alert and on every hand interested in scientific inquiry. Even our smaller communities are penetrated by the spirit of research, and the student may have the stimulation and inspiration of daily companionship with those who share his special interests. Some of you will, however, remember the small New England village of thirty years ago, will recall its relative simplicity not only in the outward mode of living but in its intellectual activity, and can picture the still simpler life which prevailed two or three decades earlier. The centre of all culture was essentially the home. The literary club, the lyceum, extensive and well selected libraries, and carefully arranged museums, which are now multiplying throughout our country, were then relatively rare. The atmosphere was not one to stimulate research. The impulse must in those days have come much more from natural aptitude, and to persons of character strong enough to take the initiative, to men who might be leaders.

To have known Mr. Frost as he was and to have seen the high character of his intellectual attainments notwithstanding the limitations of his environment, makes one long to have known him as he

might have been, had his working years fallen later in the century, when he would have been in closer touch with the moulding influences of a wider culture, and his work influenced by the advanced methods now prevalent in botanical research.

Mr. Frost always impressed me as possessing in high degree the characteristics we call puritan. Thrift, industry, perseverance, simplicity, singleness of purpose, integrity, and great reserve, were the salient features of his personality. The inspirational forces of life were his, but he lacked the surroundings that tend to life's enrichment. He had a fine face, indicating at once strength of character, the clear, dark and penetrating eyes being most pleasant to meet and suggesting the fine fibre of the man. In manner he was quietly courteous, his words were few and to the point.

For almost half a century Mr. Frost followed his trade in the one shop, and for most of this time lived in the one house, which stood near Whetstone Brook. It was a typical house of our early New England villages, long, low, and painted white, the chambers enclosed in the sloping roof. The site of the shop is now occupied by a modern business block. The house is still standing but not upon its original foundation.

Mr. Frost's business and studies held a strange companionship. All the business hours of the day found him at the bench or counter, usually the former. It was there that the visitor found him with shoe upon his aproned knee, his hands busy with awl and thread, and an open book by his side. His whole attention came directly to your need, though you knew his mind had dropped an absorbing train of thought to meet your wants. At noon the shop was closed for an hour, fully half this time being spent in the attic room, where his botanical work was done. It is easy to imagine the almost irresistible impulse to extend this short half hour, the reluctance with which researches were broken off just at a point of critical interest; yet the observer could not see but that the door of his treasure house — a veritable treasure house it was to him — was closed as readily as the door of his shop. Rare occasions there were when the shop remained closed one, two, or even three days at a time. For when some friend came, some one with kindred interests, business was laid entirely aside and even his household saw him only at meals. Our imagination need not be great or intuition especially sympathetic to tell us that these days must have been oases in life's journey. But

the visit over and the friend gone, his hours were immediately readjusted to the old routine.

To the casual acquaintance Mr. Frost spoke of his botanical interests only when questioned, but he welcomed everyone who came to him for botanical help, assisted courteously, and was always ready to give careful directions for finding the station of any plant for which the student might be inquiring.

When this reserved man labeled a specimen "more precious than gold" he was giving for a moment a swift vision of the enthusiasm and love for his special calling which lay deep in his strong nature, where it burned like a fine fire. Mr. Frost's character in its entirety makes him a representative of a type challenging admiration, compelling respect and inspiring to ideals of patient, thorough, and persevering work. It is not necessary for me to speak specifically of Mr. Frost's work in his chosen field of botanical research. Any discussion of this subject would come far more fittingly from the University of Vermont, which has just done so much to honor his name and has given his work a permanent place and association with her history.

SPIRANTHES NEGLECTA.

OAKES AMES.

(Plate 51.)

WHAT I propose to call *Spiranthes neglecta*, is a rare New England orchid, often confused with *Spiranthes praecox*, Watson, of the Southern states. It is scantily represented in most herbaria, though the known stations from which it is reported are numerous enough to show that the characters considered of specific value are not confined to a localized form. In the New England Botanical Club Herbarium there is a single specimen from Connecticut; in the Gray Herbarium there are several specimens, among them one from Washington, D. C., and one from Georgia, but none from New England, if we exclude a specimen with nothing more definite on the label as to habitat than, "collected on the Cape, August, 1896," which conjecturally may be ascribed to Massachusetts. Mr. Walter

Deane has compared plants from Easton, Massachusetts, with plants from Milford, Connecticut, in his herbarium, and has pronounced them specifically similar, and unlike *S. praecox*, Watson, collected in New Jersey.

Among the Orchidaceae published in Rhodora in the "Lists of New England Plants," Mr. Emile F. Williams reports *S. praecox*, Watson, as having been found in Massachusetts, Rhode Island and Connecticut. As I have seen no true *S. praecox* from these states, and as they are north of the northern limits of this species, the plants Mr. Williams refers to may be *S. neglecta*. It is also reported from Middlesex County, Massachusetts, by Mr. Ernest C. Smith (Rhodora, i. 97), as *S. graminea*, var. *Walteri*, Gray. According to the "Portland Catalogue," *S. praecox* is ascribed to Maine. Its absence, however, from the Maine Spiranthes in the New England Botanical Club Herbarium is remarkable, especially so, as the representation of the genus from this state is unusually rich and comprehensive. There is, however, in this herbarium a specimen of *S. cernua*, collected by J. C. Parlin in wet places at Hartford, Maine, Sept., 1885, which bears on the label the name *S. graminea*, var. *Walteri*. In the preparation of his List of New England Orchids, Mr. Williams was unable to authenticate the report of the "Portland Catalogue" regarding *S. praecox*, so that it seems advisable to omit this species at present from the Maine flora.

During August, 1903, Mr. Robert G. Leavitt, in company with Mr. H. D. Sleeper, found many plants of this neglected species at Black Point, Crescent Beach, Connecticut, where it grew in dry fields not far from the seashore. In early September, Mr. Sleeper obtained additional material from the same locality, and later, in the same month, Mr. A. A. Eaton, while collecting near North Easton, Massachusetts, came upon several stations where it was associated with *S. gracilis* and *S. cernua*, var. *ochroleuca*, hybridizing with the former.

In Rhodora (v. 261) I described the hybrid and for comparison showed drawings of the lips of the parents. The lip of what is there called *S. praecox*, Watson, as shown in the illustration is decidedly ovate in outline, and therefore very different from the oblong lip of the true *S. praecox*. In the dried state *Spiranthes neglecta* may usually be distinguished from *S. praecox* by the color and texture of the flowers, these being of a deeper brown. The lip, as a rule, is more opaque, and thicker, with the nerves showing less distinctly

than in *S. praecox*. The diacritical characters which distinguish *S. neglecta* from *S. praecox* beyond uncertainty are mainly in the lip. The callosities of the latter are decidedly marginal and basal, and the base of the lip passes rather obliquely into the claw behind them. The sides of the basal half of the lip are quite parallel and leave a very narrow, almost imperceptible margin where they pass round the callosities. In *S. neglecta*, on the other hand, the callosities do not have the appearance of being marginal, and the base of the lip

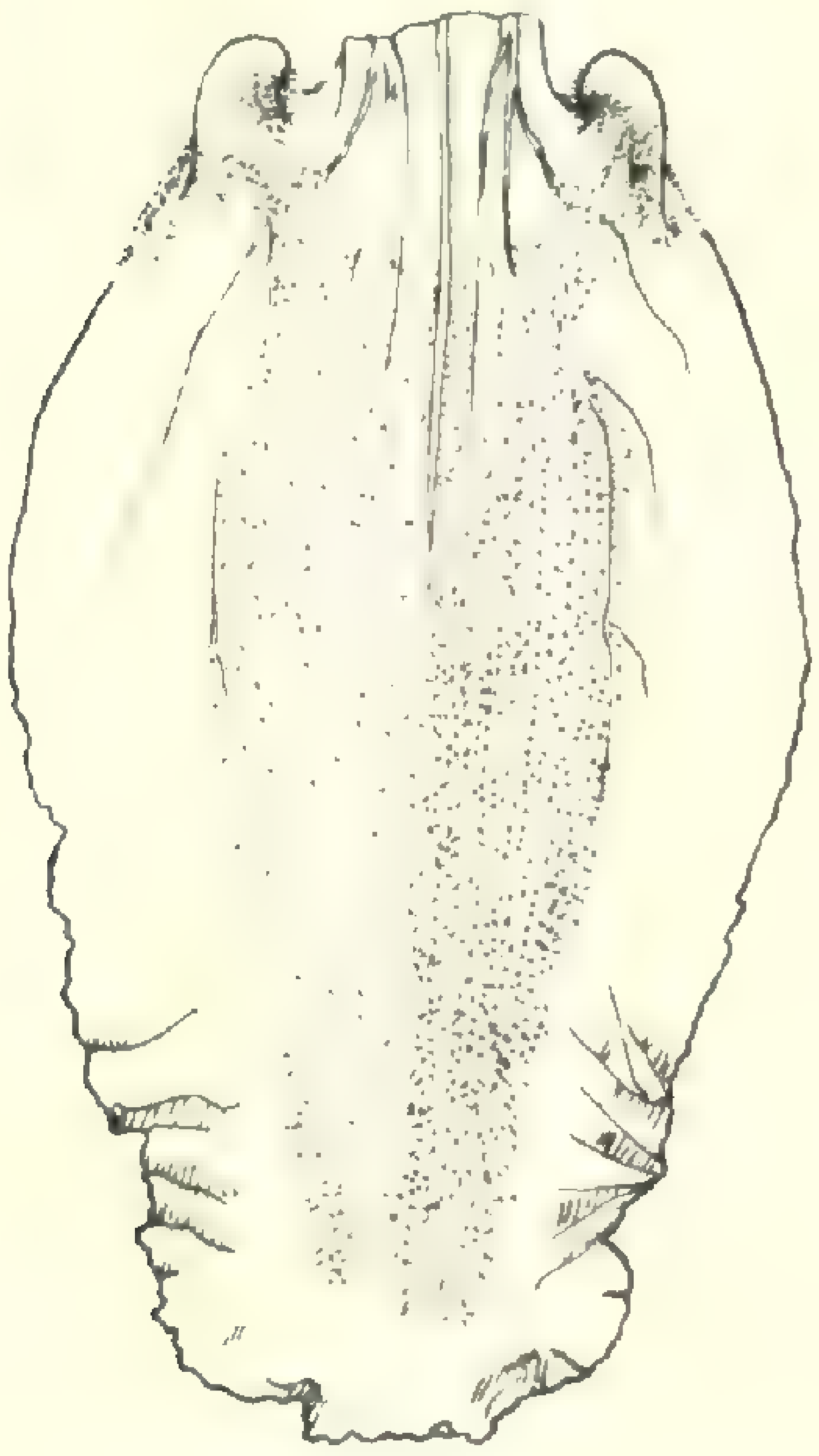


Fig. 1. Lip of Spiranthes neglecta.

Fig. 2. Lip of Spiranthes praecox, Wats.

curves gradually into the claw behind them. The sides of the basal half of the lip swell outwards and where they pass round the callosities leave a conspicuous margin. Although in general outline the lip varies from narrowly to broadly ovate and is sometimes lanceolate, it is always dilated at the proximal half and tapers noticeably to the apex. *S. praecox* is very constant in the lip outline, and when spread out the sides at base and near the apex appear to be equidistant or very nearly so, or sometimes the apical third is broader than the base.

The blooming season of *S. praecox* begins in March in the far South and somewhat later as the northern boundary of its range is approached. *S. neglecta* does not bloom till August in New England, but in Georgia, which seems to be the southernmost limit for it, the flowers open in June.

Spiranthes neglecta resembles *S. gracilis*, but only in a general way, as the elongated leaves, hyaline-margined floral bracts, pubescent rhachis (*S. gracilis* is usually glabrous or only sparsely pubescent), ovate lip, and yellowish flowers render it clearly distinguishable from that species. As it grows together with *S. cernua*, var. *ochroleuca* and *S. gracilis*, one might well regard it a hybrid derived from them, if several characters, for which it would be difficult to account on such a supposition, did not exist. The more robust plants of *S. neglecta* recall *S. cernua*, var. *ochroleuca*, but differ from it, among other things, in the shorter floral bracts, longer, more slender, linear spike, and in the narrower fugacious leaves. When dry *S. cernua*, var. *ochroleuca* is of a yellow-brown color, while *S. neglecta* especially in the leaves is deep-brown, sometimes blackish in aspect.

Spiranthes **neglecta**, sp. nov. Plant 15–56 cm. high (average height 33 cm.). Roots elongated, fleshy, fusiform; leaves linear-lanceolate, 7–15 cm. long, 8–9 mm. wide, tapering to both ends, mostly basal, the lower ones usually passing before anthesis, the upper ones withering early; cauline bracts acuminate, acute; scape smooth below, summit and rhachis pubescent, pubescence often dense, frequently extending below the uppermost cauline bract; floral bracts lanceolate-acuminate, longer than the ovaries, conspicuously hyaline-margined, margins often crenulate or wavy, base sometimes auriculate; flowers (average length of perianth 7 mm.) mostly yellowish-white, pubescent, in a regular or irregular, one-ranked spiral; spike 1–1.5 cm. thick, 8–15 cm. long, slender; lateral sepals 3-nerved, lanceolate, 6–10 mm. long, margin involute; upper sepal adhering lightly to the oblong, obtuse, 3-nerved petals; lip narrowly ovate to broadly ovate when flattened out, rarely lanceolate, strongly channeled longitudinally along the middle, apical third with an erose margin, central portion suffused with yellow or greenish-yellow, veining obscure, base gradually rounded into a short claw; callosities somewhat curved, copiously hairy on the inner side, smooth above, gynostemium much the same as in *S. cernua*, Richard. — In dry, gravelly fields, and in sandy places by the seashore. New Castle Co., Delaware, July 27, 1863; Ocean City, Maryland, July 25, 1878 (*A. Commons*); Closter, Bergen Co., New Jersey, July and August, (*C. F. Austin*); Vicinity of Washington, D. C., August, 1897, (*E. E. Steele*); Millen, Georgia, June 5, 1901 (*Roland M. Harper*) a single specimen in Gray Herbarium; Oxford, Connecticut, August, 1887, (*E. B. Harger*) a single specimen in New England Botanical Club Herbarium; Crescent, Connecticut, August, 1903, (*R. G. Leavitt & H. D. Sleeper*); Easton, Massachusetts, Sept., 1903, (*A. A. Eaton*) — *type*.

Fig. 1 shows the lip of *S. neglecta* (from Easton, Mass.) flattened

out. Fig. 2 shows the lip of *S. praecox* (from Thomasville, Georgia) similarly treated: *both from material preserved in alcohol.*

AMES BOTANICAL LABORATORY, North Easton, Massachusetts.

EXPLANATION OF PLATE 51.— *Spiranthes neglecta* to show inflorescence, leaves, and roots. (Natural size.) Fig. 1, petal (× 3). Fig. 2, lateral sepal to show involute margin (× 3). Fig. 3, flower (× 3). Fig. 4, upper sepal (× 3). Fig. 5, lip, flattened out to show outline (× 3).

MISCELLANEOUS NOTES ON NEW ENGLAND FERNS,— VI.

GEORGE E. DAVENPORT.

NOTE 10.— A NEW FORM OF NEPHRODIUM SPINULOSUM. Somewhat late in the summer of 1902 Mr. Henry A. Purdie brought to me an unusual form of *Nephrodium spinulosum*, Desv., which he had collected in Concord, Massachusetts. His specimen consisted of one large frond with narrowly angular aculeate segments resembling some forms of *Polystichum angulare*, the whole presenting an appearance quite unlike the ordinary forms of *N. spinulosum*.

Mr. Purdie reported finding only one plant, which he carefully located for further investigation, and in August, 1903, I had the pleasure of visiting the locality with him and was able to obtain a few additional fronds for specimens. I also secured, by detaching them from the main rootstock, two offshoots for propagation, and was able to separate these subsequently into two more, thus obtaining four small plants as a nucleus for further increase. The swamp in which the original plant was found abounds with *intermedium* and *dilatatum* forms of *N. spinulosum*, and characteristics of each of these are to be seen in the make-up of the new form. Indeed, it might be not inaptly described as a very much dissected var. *intermedium* with the outlines of var. *dilatatum*. In the vicinity of the plant there were a few large individuals of var. *intermedium* and from them the new fern was readily distinguishable by its unique architectural form, notwithstanding some resemblance to its nearest neighbor.

As to its probable origin two theories present themselves; for it may be either a hybrid or a spore variation. In this instance I am

not inclined to accept the hybrid theory because, although characteristics of var. *intermedium* and var. *dilatatum* may be found in its composition, these are not sufficiently obvious or pronounced to justify us in assuming the hybrid relationship of the new form. The special feature of Mr. Purdie's fern is the narrow and angular form of the segments, and in this respect there is a resemblance to some of the *angulare* forms of *Polystichum aculeatum*. In that species the segments are usually auricled at the base on the anterior side, and the auricle is essentially a characteristic of the genus; nevertheless the auricle is frequently wanting altogether, and in this way forms arise to which our fern bears a strong resemblance. In fact, if any form of *P. aculeatum* grew near by there might be grounds for assuming a hybrid relationship between it and the new form. Then, too, I believe with the distinguished and lamented botanist, Thomas Meehan, that the tendency to vary inherent in all plants is sufficient to account for most of these exceptional forms, and that it is rarely needful to resort to the theory of hybridity. It is noteworthy also that where hybridity has actually existed the resultant characters have been sufficiently evident even when actual proof was wanting; and the recent successful experiments of that very clever fern-student, Miss Margaret Slosson, in demonstrating hybridity in *Asplenium ebenoides* and *Nephrodium cristatum* × *marginale*, show very conclusively that in such instances proof is attainable.

I am much more inclined to the belief that the Concord fern is a spore-variety. There is, in fact, no reason why the results of spore-reproduction in the fern-plants should not be as diverse as those of seed-reproduction in the flowering plants. I remember to have seen once in a florist's greenhouse six plants of a Selaginella, all raised from the spores of a single individual, which was still growing near by, yet they were so different that had their origin not been positively known they might have passed as different species. Therefore, I am inclined to consider this fern as having originated from a spore of either var. *intermedium* or var. *dilatatum*, and here in comparing the different characters, I find those which suggest var. *dilatatum*, to be of a superficial nature, such as the mere outlines of the lamina and the angles of direction of the different parts, while those which suggest var. *intermedium* are fundamentally associated with fructification and vestiture. I therefore regard the plant as a natural variation of *Nephrodium spinulosum*, var. *intermedium*, and

think it will be better treated as a variety than as a mere form, as the entire plant shows the peculiar character, which is again reproduced in its offspring. It has apparently been established for some years, having attained large proportions and, fortunately, there appears to be little or no danger of its being disturbed, as the surrounding woods are safe-guarded from trespass. The plant is certainly unique in every way and entitled to recognition. I therefore submit the following description: —

NEPHRODIUM SPINULOSUM, var. **Concordianum**, n. var. (PURDIE'S CONCORD NEPHRODIUM.) Original plant large, with matured fronds two and one-half to three feet in height. Rootstock as in the species; crosiers densely clothed with rich brown scales; stipites one-fourth to one-third the length of the whole frond, greenish-stramineous in the early stages but at length turning to a warm brownish tone, channeled along the face, rounded at the back; scales at base broadly ovate-acuminate, dark brown with deeper centres, the upper pale and intermixed with narrower linear scales and chaff; laminae one and one-half to two feet long, correspondingly broad, narrowing from below the middle upward to an acuminate apex, tripinnate throughout, the inferior pinnules on the lowermost pinnae of the larger fronds two inches long and pinnate with pinnatifid or deeply lobed oblique divisions; segments distinct, narrowly angular, about one-eighth of an inch wide, sharply aculeate, the base so narrow as to appear stalked (in some cases really so); rachises scaly throughout with small pale scales and chaff; venation pinnate; sori below the apex; indusia and surfaces minutely glandular.

Habitat: rich swampy woodland, Concord, Massachusetts, autumn of 1902, *H. A. Purdie & Wm. Brewster*; August, 1903, *H. A. Purdie & G. E. Davenport.*

As the discoverer of this interesting fern protested with his usual modesty against my associating his name with it, I have decided to dedicate it to Concord. Type specimens from the original plant will be deposited in the Gray Herbarium, the Herbarium of the New England Botanical Club, and the Davenport Herbarium (Massachusetts Horticultural Society).

MEDFORD, MASSACHUSETTS.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,— XIII. JUNCACEAE.[1]

M. L. FERNALD.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Juncus acuminatus, Michx.	+	+		+	+	+
" alpinus, Villars	+		+			
" " var. insignis, Fries	+		+			
" articulatus, L.	+	+	+	+	+	+
" " var. obtusatus, Engelm.	+	+	+	+	+	+
" balticus, Dethard	+	+		+		
" brachycarpus, Engelm.				+		+
" brachycephalus, Buchenau	+		+	+		+
" brevicaudatus, Fernald	+	+	+	+	+	+
" bufonius, L.	+	+	+	+	+	+
" " var. congestus, Wahl.	+					
" " var. halophilus, Buchenau & Fernald	+			+		
" canadensis, J. Gay	+	+	+	+	+	+
" " var. subcaudatus, Engelm.						+
" debilis, Gray						+
" dichotomus, Ell.				+		+
" Dudleyi, Wiegand	+	+	+	+	+	+
" effusus, L.	+	+	+	+	+	+
" " var. compactus, Lejeune & Courtois	+			+		
" filiformis, L.	+	+	+	+		
" Gerardi, Loisel	+	+	+	+	+	+
" Greenii, Oakes & Tuckerman	+	+	+	+	+	+
" marginatus, Rostk.	+	+	+	+	+	+
" militaris, Bigelow	+			+	+	+
" nodosus, L.	+	+	+	—		+
" oronensis, Fernald	+					
" pelocarpus, E. Meyer	+	+	+	+	+	+
" secundus, Beauv.	+		+	+	+	+
" stygius, L., var. americanus, Buchenau	+					
" subtilis, E. Meyer	+					

[1] Printed in RHODORA as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Juncus tenuis, Willd.	+	+	+	+	+	+
" " var. anthelatus, Wiegand	+			+		+
" " var. Williamsii, Fernald	+	+	+	+	+	+
" Torreyi, Coville				+		
" trifidus, L.	+	+	+			
" Vaseyi, Engelm.	+					
Luzula campestris, DC., var. frigida, Buchenau	+					
" " var. multiflora, Celakovsky	+	+	+	+	+	+
" confusa, Lindeberg	+	+				
" parviflora, Desv.	+	+	+	+		
" saltuensis, Fernald	+	+	+	+		+
" spicata, Desv.	+	+	+			

Notes upon the above List.

Juncus alpinus, Villars, with castaneous capsules, is the characteristic plant of the Gulf of St. Lawrence and extends locally southward to the St. John valley in Maine and to Willoughby Lake, Vermont. *J. alpinus*, var. *insignis*, Fries, the commoner plant of the St. John and Kennebec valleys and occurring locally on Lake Champlain, has pale capsules and is usually a larger plant. Both forms occur in northern Europe.

Juncus articulatus, L. The typical form has brown flowers, the castaneous capsules 3–4 mm. long, gradually tapering to the mucronate tip. Var. *obtusatus*, Engelm., with greenish or greenish brown flowers, the pale capsules 2.5–3 mm. long and abruptly mucronate, often replaces it in brackish or alkaline situations, and on the coast is occasionally found in salt-marshes.

Juncus **brevicaudatus**. *J. canadensis*, var. *brevicaudatus*, Engelm., Trans. St. Louis Acad. ii. (1866) 436; var. *coarctatus*, Engelm. l. c. ii. (1868) 474. This northern plant has long seemed to the writer to be unfortunately treated as a form of the essentially southern and, in New England, mostly coastal *J. canadensis*. A detailed examination of the great mass of material now accumulated by the Gray Herbarium and the New England Botanical Club indicates several important points of distinction and confirms the long established conviction, which has been shared by others who know the two plants in the field.

Juncus canadensis is a stout plant with the inflorescence (when well developed) ovoid or broader in outline, at most one-third longer than broad, the branches spreading or subascending; the glomerules

are densely many-flowered, the perianth-segments awl-pointed, equalling or slightly shorter than the abruptly short-pointed capsules; and the seeds are 1 to 1.8 mm. long. *J. brevicaudatus* is a slender plant with the inflorescence elongate, strict, and narrow, three to six times longer than broad; the glomerules are 3–7-flowered, the outer perianth-segments (sepals) acute, but scarcely awl-pointed, the inner (petals) acute or obtusish, and much shorter than the prismatic gradually pointed capsules; and the seeds are very rarely more than 1 mm. long. Furthermore *J. canadensis*, which occurs in marshes, swampy meadows, and on wet shores, is commonest on the coastal plain from southern Newfoundland to Louisiana, and on the upper St. Lawrence and the Great Lakes, though it is occasionally found at other inland stations. Its average fruiting season is in early September, fruited (but not over ripe) material from 40 stations showing a range from August 12 to October 8 with an average of September 9. *J. brevicaudatus*, on the other hand, abounds in damp open soil, roadsides, ditches, wet rocks, shores, etc., from Newfoundland to the upper Saguenay, west to Minnesota, and south, mostly in cold bogs, to the mountains of Pennsylvania. Its fruiting season is four weeks earlier in the same region than that of *J. canadensis*, mature specimens from 54 stations showing a range from July 16 to September 9, with an average of August 12. In view of these marked differences the writer feels justified in treating the strict northern plant as a distinct species.

Juncus effusus, var. *compactus*, Lejeune & Courtois, Compend. Fl. Belg. ii. (1831) 23, with inflorescence glomerulate, has passed in America as *J. effusus*, var. *conglomeratus*, Meyer (*J. conglomeratus*, L. *J. Leersii*, Marsson) which is a distinct species of Europe, known also in America from Newfoundland and Nova Scotia. *J. effusus*, var. *compactus*, is the common form of the species in Cape Breton and Nova Scotia proper and occurs frequently in eastern Maine, but is apparently unusual southward.

Juncus (Poiophylli) **oronensis**. Perennis dense caespitosus. Caules erecti stricti pallide straminei vel flavo-virides 3–6 dm. alti. Folia basilaria; vagina pallide fusca vel rosea; auriculae membranaceae vel fere scariosae; lamina gracillima firma valde involuta 1–2 dm. longa. Inflorescentia subdichotoma 2.5–9 cm. longa 1–4 cm. diametro; rami stricti suberecti, flores plerumque secundi distincte distantes vel rarius approximati et umbellulati. Bractea erecta inflorescentiam multo superans. Flores 4–5 mm. longi pallide straminei. Tepala lanceolato-subulata marginibus angustis membranaceis vel omnia subaequilonga vel tria interna paullo breviora. Stamina 6 tepalis ½ breviora; filamenta linearia; antherae lineares filamenta aequantes. Fructus tepalis brevior oblongus trigonus truncato-emarginatus lateribus planis vel prope apicem paullo concavis;

stigmata sessilia vel subsessilia. Semina 1 mm. longa circa 0.2 mm. diametro sigmoideo-fusiforma basi et apice albo-caudata, caudis quam nucleus fuscus ter brevioribus, longitudinaliter circa 15-costata reticulata.—Hab. in paludibus sphagnosis. Orono et Rangeley, Maine.

Perennial, densely caespitose. The stiff erect culms 3–6 dm. high, pale straw-color or yellow-green. Leaves mostly basal; the sheaths pale brown or pinkish, with membranous or almost scarious auricles; the blades very slender, firm, strongly involute, 1–2 dm. long. Inflorescences usually much overtopped by the erect bracts, subdichotomous, 2.5–9 cm. long, 1–4 cm. in diameter; the flowers mostly secund and distinct along the strict suberect branches, rarely umbellulate. Flowers 4–5 mm. long, pale straw-color, the lance-subulate segments firm, with narrow membranous margins, subequal or the inner slightly shorter. Stamens half as long as the perianth-segments; the linear anthers equalling the slender filaments. Capsule shorter than the perianth, oblong, trigonous, truncate-emarginate; the sides flat or a little concave toward the tip; stigmas sessile or subsessile. Seeds 1 mm. long, about 0.2 mm. thick, sigmoid-fusiform, white-caudate at base and apex, the tails one-fourth as long as the brown body, longitudinally about 15-ribbed, reticulate. — Maine, swamp with *J. Vaseyi* and *J. tenuis*, var. *anthelatus*, Orono, August 13, 1890, July 21, 1892 — no. 300, distributed as *J. dichotomus*, **type** (*M. L. Fernald*); Rangeley, 1882 (*Kate Furbish*).— This plant has long been a perplexing one. At Orono, where it abounds in a dry sphagnum-carpeted remnant of a larch- and alder-swamp, it is mixed with the characteristic northern *J. Vaseyi* and *J. tenuis*, var. *anthelatus*, and when first found it was very immature. From this immature material, with its strongly involute firm leaves, the plant was referred by a student of the genus to whom it was shown to *J. dichotomus* of the southern coastal plain. In 1892 excellent fruiting material was collected, and without further examination placed with that of earlier date. The plant seemed in some points so unlike *J. dichotomus* that Dr. K. M. Wiegand, when studying the group for his recent valuable synopsis [1] was unwilling to leave it with that species, but, as indicated on the herbarium sheets and in a letter to the collector, he preferred to consider it a doubtful form as nearly allied to his *J. tenuis*, var. *anthelatus*. Recently, in overhauling some specimens collected in 1882 by Miss Kate Furbish at the Rangeley Lakes, far above the level in Maine of the coastal plain, the writer was surprised to find mixed with good *J. Vaseyi* fruiting material of the plant which at Orono is associated with *J. Vaseyi* and which now proves to be a species quite unlike either *J. dichotomus* or *J. tenuis*. In both those species the capsules are ovoid or obovoid, rounded to the mucronate tip, and with rounded or convex sides; the tiny oblong seeds (0.3–0.4 mm. long) are bluntly apiculate; and the anthers are distinctly shorter than the fila-

[1] Wiegand, Bull. Torr. Cl. xxvii (1900) 511–527.

ments. In *J. oronensis*, on the other hand, the capsule is oblong, truncate-emarginate, at most mucronulate, the sides flat or at tips concave; the larger spindle-shaped seeds have distinct white caudate appendages; and the anthers equal the filaments. These characters place the plant very near the northern *J. Vaseyi*, but from that it is clearly distinct in its elongate subdichotomous inflorescence, long bracts, capsule shorter than the perianth, and in the short caudate seeds, those of *J. Vaseyi* having the tails more than half as long as the dark body.

Juncus Torreyi, Coville. The only New England station known is along a railway ditch at Chelsea, Massachusetts, found by Mr. W. P. Rich[1] in 1901. The species is ordinarily of inland distribution, from western New York and adjacent Pennsylvania westward, and it is probable that the Chelsea plant is of recent introduction.

Luzula campestris, DC., in its typical form, a loosely caespitose and strongly stoloniferous plant with 2–6 large (6–7 mm. thick) castaneous spikes on wide-spreading or decurved peduncles, seems to be confined to northern Europe. Its common representative in America, as in parts of Europe and Asia, is var. *multiflora*, Celakovsky, Prod. Fl. Böhmen (1869) 85 (*L. multiflora*, Lejeune), densely caespitose, with the 3 to 12 subglobose or oblong ferruginous or pale brown (greenish in deep shade) spikes on mostly ascending peduncles. Var. *frigida*, Buchenau, Oest. Bot. Zeitsch. xlviii. (1898) 284, with very short peduncles and subglomerulate dark brown to nigrescent spikes, occurs from Greenland to Newfoundland, and reaches our district in northern and eastern Maine.

Juncus bufonius and its Representatives in America.

During the summer of 1902 members of the New England Botanical Club who botanized on the coast of eastern Maine and the Maritime Provinces were much interested in the variations of *Juncus bufonius*, and particularly in its behavior upon the salt marshes and below the limit of high tide. Abundant material was secured and during the following winter the writer undertook a study of the species. The results of this study were the decision that in North America we have not only true *Juncus bufonius* with certain well marked varieties and a number of trivial forms, but that in the western districts, from the Rocky Mountains to California, etc., much which has passed as *J. bufonius* is the well-known Old World species, *J. sphaerocarpus*. In order to verify his conclusions the writer sent materials and notes to the distinguished specialist on the *Juncaceae*, Prof. Franz Buchenau of Bremen, and after a detailed correspondence and a study of much material, generously augmented by critical specimens from Prof. Buchenau, he presents the following treatment of *J. bufonius* and its allies as known to him in North America.

[1] See Rhodora, iv. 170.

* Capsule trigonous, oblong to ovoid, 3 to 4.5 mm. long, in maturity rather closely embraced by the ascending perianth.

J. BUFONIUS, L. Sp. (1753) 328. Perianth-segments all acute or subulate-attenuate, longer than the capsule, the inner (petals) slightly shorter than the outer. Seeds ovoid, apiculate at base and apex. Plant varying greatly in size and habit, 0.3 to 3.5 dm. high, erect or matted, subsimple to freely branched; the flowers mostly scattered and secund on the elongate branches, occasionally "viviparous." — Damp open soil, roadsides, ditches, etc., nearly cosmopolitan.

Var. CONGESTUS, Wahlb. Fl. Goth. (1820) 38. Flowers similar, mostly aggregated in glomerules.—*J. Congdoni*, Watson, Proc. Am. Acad. xxii. (1887) 480; and various other synonyms (see Buchenau, Mon. Junc. 176).— Rather unusual in North America. Examined from MAINE, North Lubec (*Kate Furbish*): SOUTH CAROLINA, Sullivans Island (*Ravenel*): TEXAS, Galveston (*Lindheimer*): CALIFORNIA, Mariposa and San Mateo Counties (*Congdon*).

Var. **halophilus**, Buchenau et Fernald, var. nov. Flores ultimi saepe approximati. Tepala externa acuta acutata vel subulato-acutata fructu fere semper longiora, interna breviora obtusa vel rotundato-obtusa interdum mucronata fructum subaequantia (vel paullo longiora breviorave). Semina apice truncata.— Hab. in locis salsis. Quebec, Prince Edward Island, Maine, Massachusetts; Germany, Sicily.

Formae intermediae *Juncus bufonii* (genuini) et var. *halophili* haud raro occurrunt, praecipue in locis salsis. Pro exemplo: *J. ranarius*, A. Songeon et E. Perrier (Billot, Annotations, 1859, 192) tepala interna fructum subaequantia vel paullo superantia[1] acuta vel obtusa et semina ovoidea praebet.

Ultimate flowers usually approximate. Outer perianth-segments acute, acutish, or subulate-acute, usually equalling or exceeding the capsule; inner segments (petals) shorter, obtuse or rounded, rarely mucronate, shorter than or barely equalling the capsule. Seeds truncate at apex.— Wet, usually brackish or alkaline soil. QUEBEC, marshes, Rivière du Loup, Aug. 15, 1892 (*G. G. Kennedy*), August 2, 1902, **type** (*E. F. Williams & M. L. Fernald*), Aug. 8, 1902, (*J. R. Churchill, W. W. Eggleston, M. L. Fernald*); brackish shore, New Carlisle, July 28, 1902, mouth of Bonaventure River, July 31, 1902 (*E. F. Williams & M. L. Fernald*): PRINCE EDWARD ISLAND, above the beach, Summerside, July 21, 1901, and bog, Tracadie Beach, July 30, 1901 (*J. R. Churchill*): MAINE, salt marshes, Cutler, July 4 and 7, 1902 (*G. G. Kennedy, E. F. Williams, J. F. Collins, & M. L. Fernald*): MASSACHUSETTS, Plum Island, New-

[1] "Divisions du périgone . . . , les trois *extérieures acuminées, subulées, dressées . . . . égalant la capsule ou la dépassant à peine, les intérieures* plus largement scarieuses et moins roulées sur les bords, *plus ou moins aiguës* et *un peu plus courtes que la capsule mûre*" . . . . Songeon et Perrier, l. c.

buryport (*Wm. Oakes*): Germany, Nienburg an der Weser, 1859 (*Nöldaka*); Weimar, August 22, 1888 (*Torges*): Sicily, Porto Empedocle, Girgenti, May 30, 1885, Paterno, Catania, June 2, 1885 (*W. O. Focke*).— A strongly marked extreme, in its best development, with its broad blunt short inner perianth-segments and short truncate seeds, seeming very distinct from true *J. bufonius*, but clearly connected with that common species by specimens from various regions. Thus *J. ranarius*, A. Songeon and E. Perrier, described from borders of salt water near Moûtiers, Savoie, has the inner segments thin and barely equalling or rarely exceeding the capsule, acute or obtuse, and the seeds ovoid. Other plants showing transitional tendencies in the perianth or in the shortening of the seed have been examined from such extreme regions as Lapland, South Australia, and Manitoba, so that it is probable that *J. bufonius*, var. *halophilus* is broadly distributed over the globe.

* * Capsule subspherical or short-ovoid, 2 to 3 mm. long: perianth-segments in maturity with loosely spreading-ascending or subsquarrose tips.

J. sphaerocarpus, Nees in Funck's Correspondenz, Flora (1818) 521. Resembling *J. bufonius*, but very slender, rarely 2 dm. high: quickly distinguished by its small capsules and loosely ascending perianth-segments.— A well-known species of central and southern Europe and Asia. The following American specimens have been examined. Rocky Mountains, without station cited (*Hall & Harbour*, no. 559, in part): Idaho, common in wet places, valley of Big Potlatch River, Nez Perces County, June 4, 1892 (*Sandberg, MacDougal & Heller*, no. 312). Oregon, Swan Lake Valley, Klamath County, June 6, 1895 (*Applegate* no. 751, in part): California, margin of pool, Mendocino City, May, 1866 (*Bolander* — material distributed in Engelmann's Herb. Junc. Bor.-Am. Norm., no. 28, as "*J. bufonius forma erecta sepalis subaequalibus capsulam retusam longe superantibus.*"); Woodland, April 15, 1893 (*Blankinship*); Sisson, Siskiyou County, June, 1897 (*H. E. Brown*, no. 346); Chico, 1885 (*A. Gray*); San Isabel, May, 1852 (*Thurber*, no. 620). Arizona, vicinity of Flagstaff, alt. 7000 ft., July 8, 1898 (*MacDougal*, no. 241).

Suggestions for Special Observations.

Juncus balticus, Dethard, ordinarily a companion of *J. Gerardi* along the coast, is common on ledgy and gravelly river-banks of Aroostook County, Maine, with *J. alpinus*, var. *insignis*, *J. brachycephalus*, *Tofieldia glutinosa*, etc., and in an inland swamp of Genesee County, New York, with *Scirpus Torreyi*, *Zygadenus chloranthus*, etc. It should, therefore, be expected to accompany some of those characteristic species in the Champlain Valley.

Juncus brachycarpus, Engelm., found locally on the coast of New Haven County, Connecticut, and of Plymouth County, Massachusetts, will possibly be found in light soil near the coast of Rhode Island.

Juncus bulbosus, L., similar to *J. subtilis*, but with more numerous flowers in glomerules and blunt capsules, occurs in water and in boggy places in Labrador, Newfoundland, and on Sable Island, Nova Scotia, and should be sought on our northern borders.

Juncus castaneus, J. E. Smith, found on Newfoundland and Anticosti, and common on the northern Rocky Mountains, may yet be discovered on the mountains of northern New England.

Juncus conglomeratus, L. (*J. Leersii*, Marsson) similar to *J. effusus*, var. *compactus*, but with more rigid costate scapes, and with capsules tipped by a crown-like blunt mucro, occurs in southern Newfoundland and Nova Scotia and possibly reaches eastern Maine.

Juncus dichotomus, Ell., known near the coast of Connecticut and of Massachusetts, is to be sought in Rhode Island.

Juncus oronensis, Fernald, occurs on Rangeley Lake, Maine, and is probably in damp thickets or swamps of Coos County, New Hampshire.

Juncus scirpoides, Lam., has been reported from various New England stations, but all the specimens seen by the writer have proved to be other species. It occurs, however, along the coast from Florida to Long Island, and may well be expected to extend northward to Cape Cod.

Juncus stygius, var. *americanus*, Buchenau, one of the rarest and most evasive of American rushes, has been known in bogs of Somerset County, Maine, and Jefferson County, New York. It may, therefore, be hopefully sought in northern New Hampshire and Vermont.

Juncus trifidus, var. *monanthus*, Bluff & Fingerhuth, Compend. Fl. Germ. sect. i. (1825) 440, with the numerous basal leaves equalling the slender culms (2.5–6 dm. high) occurs locally along the mountains from Ulster County, New York, to Virginia and North Carolina, and should be looked for in New England, especially in Litchfield County, Connecticut, and Berkshire County, Massachusetts.

Juncus Vaseyi Engelm., found locally near the Rangeley Lakes, and in the Penobscot and St. John valleys, Maine, and in the valley of the Black River, Jefferson County, New York, is to be expected in northern New Hampshire and Vermont.

The Black Spruce in Rhode Island.— In 1888 Mr. J. L. Bennett recorded[1] *Picea nigra*, Link, as occurring in "Johnston, Foster, etc." Apparently no specimens were preserved by him to corroborate this statement and as a result certain botanists have been somewhat skep-

[1] Plants of Rhode Island (1888), p. 40.

tical of its occurrence in Rhode Island. Mr. L. L. Dame in his excellent little hand book[2] says of it "Rhode Island — not reported," meaning that he had seen no specimen from the state. Sometime during last winter or early in the spring of the present year (1903) Mr. H. W. Preston called the writer's attention to this statement of Mr. Dame's, and suggested that we make special effort to get some herbarium specimens as both of us recollected having seen a group of the trees within a year in Scituate (Rhode Island), while riding on one of the Danielson electric cars.

About this time Mr. G. W. Burlingame sent to the Brown University Herbarium, for identification, a specimen of the Black Spruce which was collected, as I learned later, at the station just mentioned. Mr. Preston has since then visited this place and photographed the trees.

Early in May the writer spent a day about Wakefield Pond, Burrillville, in company with Rev. R. F. Cheney of Pascoag. At the time of our visit the water appeared to be higher than usual — though it may not have been — and what looked at a short distance like several ordinary islands proved, upon closer inspection, to be partially of wholly submerged islands — if such an expression be allowed — often with only the bushes and small trees projecting above the water.

These trees were nearly all Black Spruce and we counted more than a hundred on three or four of these "islands." Many of the spruces were in fruit while, in some cases, scarcely a meter in height. Perhaps the tallest one we saw was growing on the mainland — it was estimated to be 5 or 6 meters high. It is probable that the Black Spruce occurs at quite a number of stations in northern Rhode Island as it has been reported from at least six different towns, although the writer has personally seen it in but two of them, as stated.— J. Franklin Collins, Providence, Rhode Island.

Panicum Commonsianum in Connecticut.— In June, 1902, and again a year later I collected, in a "sand-blow" in South Windsor, Connecticut, a plant which proves to be *Panicum Commonsianum*, Ashe. There were a few scattered clumps of it, growing in pure sand, some with *Carex siccata* and other plants of dry ground, some in places where nothing else had the courage even to try to exist. Mr. Fernald

[2] Dame and Brooks: Handbook of the Trees of New England (1902), p. 12.

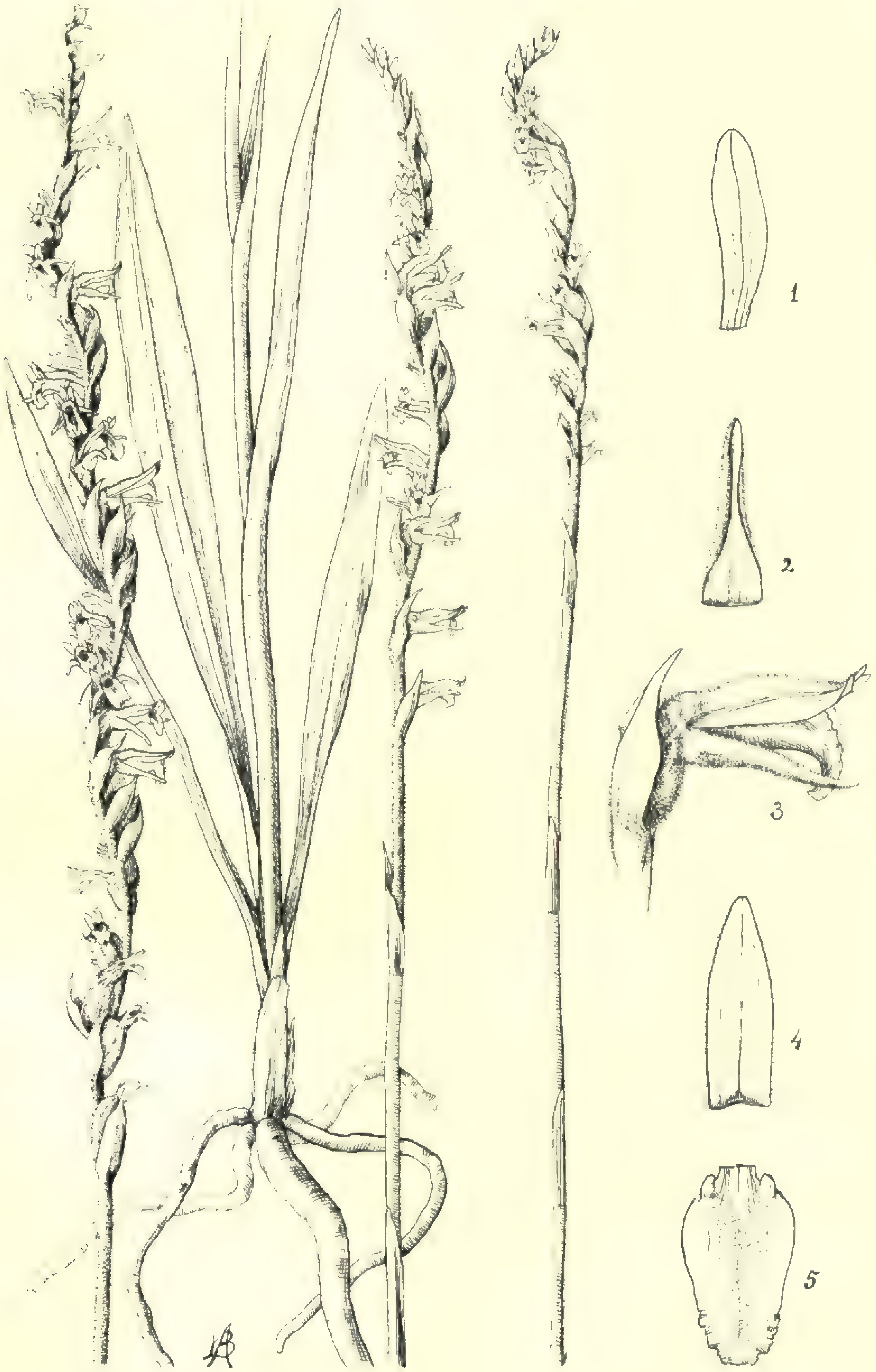
informs me that this species of Panicum, originally described from the pine-barrens of New Jersey, has not before been reported from New England. I have never seen the New Jersey barrens, but I imagine the region in which I found my Panicum is not unlike them. It is a tract of low sand hills and plains, covered for the most part with rather sparse and scraggy woods, but here and there bare of all vegetation. It was on the edge of such a "sand-blow" that the Panicum grew. *P. xanthophysum* is another denizen of the same region, which can be found by a sufficiently patient seeker. It took me an hour and a half last summer to find two small plants — but it is there. — C. A. Weatherby, East Hartford, Connecticut.

Some Interesting Mosses from a Southern Vermont Peat-bog.— A peat-bog of Pownal, Vermont, which furnishes a station for several flowering plants of northern range, is also the abode of several mosses considered uncommon in New England. Especially worthy of mention are the following: *Hypnum cuspidatum*, L., *Hypnum vernicosum*, Lindb., *Polytrichum strictum*, Banks., *Camptothecium nitens*, Sch., *Meesia tristicha*, Br. & Sch. and *Dicranum Bonjeani*, DeNot. All are species of more or less northern tendencies. All except the last are included in the Vermont list, but with not more than one or two stations, generally much farther north. The Polytrichum is a species associated in New England rather with alpine mountain summits than with lowland peat-bogs. The Dicranum Dr. True characterizes as representing the typical form of the species, a form which he considers rare. The species has not been included in the Vermont list. The mosses of this peat-bog, which is an especially wet and spongy one, if the matter is one admitting of comparison, are by no means profuse in the matter of spore-production. The only one of the above to fruit even comparatively freely is the Dicranum. Meesia is sufficiently conspicuous with its distinctly three-ranked leaves, and I was doubly delighted to find the past summer a small tuft bearing numerous sporophytes, very striking indeed with long seta and pendulous capsule upon a long, erect apophysis. In the summer of 1902 a small tuft of Camptothecium also produced fruit, an uncommon occurrence for the species. The other species mentioned were sterile. Of more common sorts, I noted *Aulacomnium palustre* sparingly fruited in 1901, though it

generally contents itself with pseudopodia and gemmae, *Sphagnum acutifolium* in 1902, and *Sphagnum cymbifolium* in 1903. The fruiting specimens of Sphagnum were in either case at the top of large, compact tufts where conditions were slightly less moist. Of the less common species of Sphagnum none appeared to be fructifying.— A. LeRoy Andrews, West Virginia University, Morgantown.

Spiranthes Grayi, nom. nov. About three years before the publication of the fifth edition of "Grays' Manual," A. H. R. Grisebach, in the "Flora of the British West Indian Islands" described a new species of Spiranthes as *S. simplex*. In the fifth edition of the "Manual" Asa Gray described under the same name a new species, native to the United States. As the two species described are distinct this duplication of specific names in the genus is unfortunate and, in a broad sense, confusing, therefore, I propose to call our native plant *S. Grayi*.— Oakes Ames.

Vol. 6, no. 61, including pages 1–24 and plate 50 was issued 30 January, 1904. Mr. Fernald's article, Two Northeastern Allies of Salix lucida (reprinted in advance) was issued 29 December, 1903.



Blanche Ames, del.

SPIRANTHES NEGLECTA, *Ames, n. sp.*

Rhodora

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PARTIAL REVERSION IN LEAVES OF THE FERN-LEAVED BEECH.

R. G. Leavitt.

The European beech, *Fagus sylvatica*, has produced a number of varieties, of which several are in cultivation. These forms have almost surely originated by sudden saltatory changes; that is, by mutation. The varieties differ from the species in one or more characters which — at least in several of the varieties — may be transmitted by seed. The well-known purple beech is one of these offshoots from the specific stock. The original tree was discovered in Germany between the middle and the end of the eighteenth century, according to some, and in Loudon's day was said to be still standing. According to Loudon all the purple beeches cultivated in Europe in his time had been produced from this tree either by seed or by grafting. The seedlings come up tolerably true. Other varieties are *F. s. pendula*, *F. s. cristata* — the leaves small and tufted, the wood dark and curiously grained — and *F. s. asplenifolia*. The last named form, upon which some observations are made below, according to De Vries may be propagated by seed. It differs from the species in having narrowly elliptical or lanceolate leaves, variously cut, while the leaves of the species are, as a rule, broad and almost or quite entire. This form has originated, with little doubt, by mutation from the older type. Such "sports" are of special interest to students of evolution for the light they may possibly throw upon evolutionary processes.

One of the chief problems to be solved in working out the origin of species is whether new races arise by the accumulation of slight variations, or whether the alterations are more violent and sudden, so that new species are abruptly created with differentiating characters

fully formed. It is certain that now and again new races do appear suddenly. Many of them come reasonably true to seed; and in this fact lies an argument for the stability of the new forms. Nevertheless the period during which such matters have been subjects of inquiry is not long. What the results of protracted breeding experiments may be is as yet problematical. Granting that the newly appearing, or as they are called *mutational*, characters have a certain force as hereditary factors, it is yet to be ascertained whether the races produced by mutation do not of themselves ultimately return to the "normal," or original, type. If we conceive that the change of outward characters which signifies the occurrence of a mutation is the visible expression of an inversion or derangement of the constituents of the complex substance controlling the development of form, and in reproduction serving as the vehicle of hereditary traits, then it seems possible that after a time these constituents may regain their previous, or normal, arrangement and in consequence the original external characters be restored.[1]

The tendency of *Fagus sylvatica asplenifolia* to revert in certain parts is well known. De Vries speaks of frequent atavistic bud variation.[2] Carrière[3] figures a young shoot on one side of which all the branches bore exclusively leaves of the specific form. A tree growing at North Easton, Massachusetts, has manifested a still further localized and restricted resumption of original characters. Atavism has appeared not in one branch, or one bud, but in a part of a leaf, in many instances. In most cases about one quarter to one third of the lamina was thus affected, usually in the proximal part, occasionally in the distal, on one side or other of the midrib. These leaves were unsymmetrically developed, as will be seen from the accompanying figure, through overgrowth of particular regions of the blade. The unusual portions had entire or at most somewhat dentate margins. When the blades were applied to blades of the same length taken from the species, so that bases, apices, and midribs coincided as nearly as possible, the margins of the overgrown parts

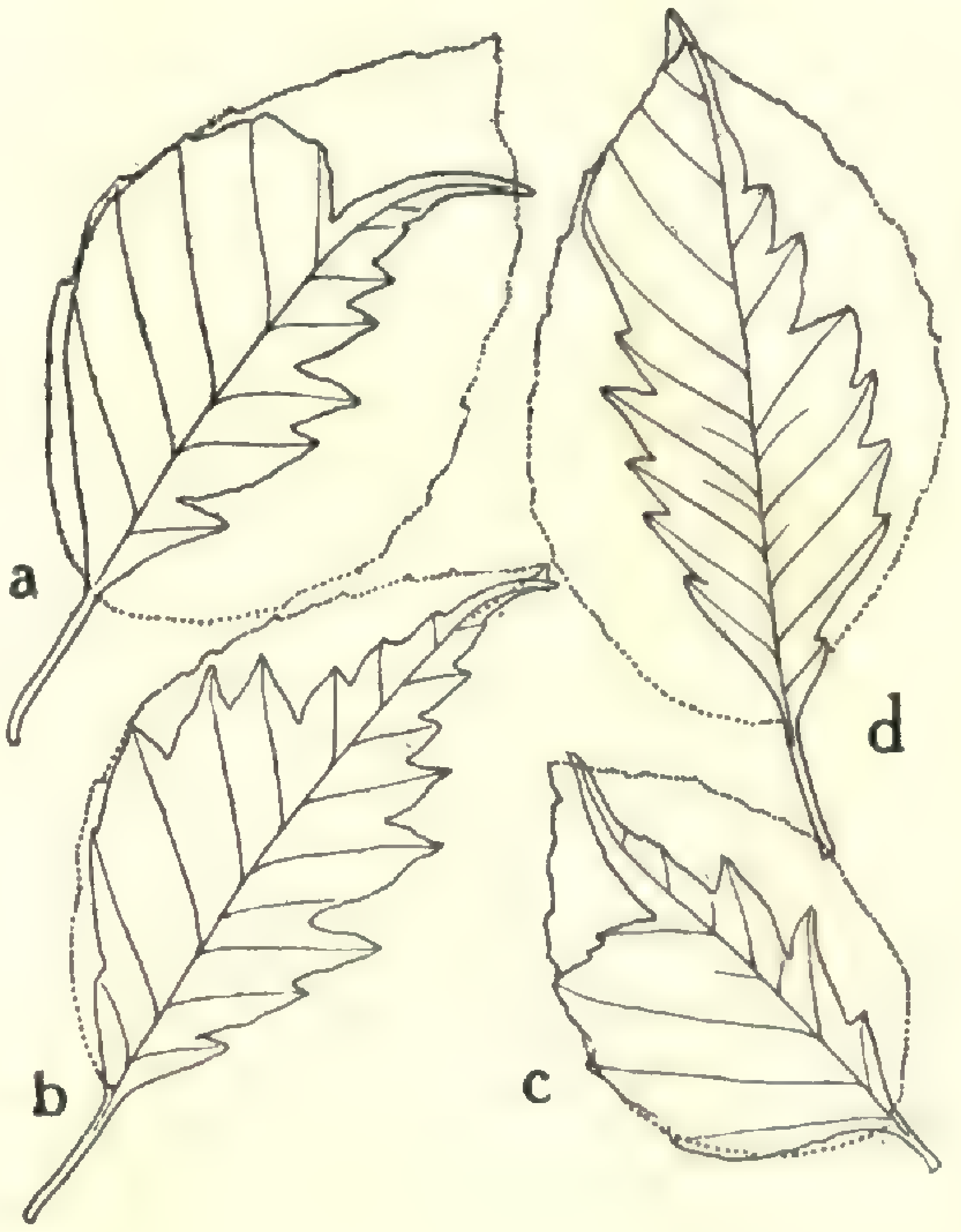
[1] Students of our native flora may render good service to science by reporting and describing aberrant forms and by cultural experiments. Careful notes contributed to botanical journals would be of much value. Careful and full records of how the new or unusual forms behave in prolonged vegetative reproduction, in propagation by seed after pollination by their own pollen and after cross-pollination with the normal forms, are especially desired.

[2] De Vries, Die Mutationstheorie, 1: 488.

[3] Carrière, Production et Fixation des Variétés (Paris 1865), p. 49.

of the varietal laminae very nearly coincided with the margins of the corresponding parts of the specific laminae. In lateral extent, in the angle between margin and midrib, and in the character of the margin, the parts in question agree nearly with parts similarly situated in leaves of the original type. There is therefore no doubt that we are here dealing with a reversion.

In the Figure — the original drawing for which was traced from the leaves themselves — the abnormal leaves of the variety are delineated in continuous line, the applied specific leaves in broken line. In the specimens as placed the right side of the lamina is true to the varietal type, showing the somewhat fern-like margin to which the variety owes its designation, *asplenifolia*. Specimens *a*, *b*, *c* have the proximal half or more of the left side extended to the limits habitual in the specific form, while the remainder is contracted in the manner of the variety. In specimens *a* and *c* the transition from one character to the other is abrupt; in *b*, gradual. In specimen *d* the region of disturbance is distal and includes not more than one eighth of the entire blade; in this part, however, the margin of the ancestral form is exactly matched except at the very apex of the blade, where the attenuation characteristic of the variety appears.



The sudden transition seen in specimens *a* and *c* is especially interesting and noteworthy.

It is to be observed that, as a close examination of the figure will show, the restoration of the original form is in no case perfect. While the old — the specific — predominates in a remarkable degree, the new is evidenced in some way in each atavistic section, either at the apex, as in *d*, or at the base, as in *a–c*, or throughout, as in *b*.

Both old and new form-giving factors are present and operative at once in the same field, and the actual figure imparted is a resultant. Whether reversions ever reproduce past and now relinquished structures with entire exactness is at least questionable.

Many leaves of the tree mentioned were of the same dual character as those here figured. In each blade as a whole the varietal character predominated, while partial atavism when present was shown in various degree. The examples found were not confined to a few branches but were well scattered, and occurred without any apparent rule.

Ames Botanical Laboratory, North Easton, Massachusetts.

NOTEWORTHY PLANTS OF SOUTHEASTERN CONNECTICUT,— IV.

C. B. Graves.

Sisyrinchium intermedium Bicknell. This species is represented in my herbarium by two collections: Ledyard, near Pine Swamp, June 7th, 1897, and New London, field near Ocean Beach, June 28th, 1902. The specimens differ from material at the Gray Herbarium, named by Mr. Bicknell, only in the color of the spathes which are greenish rather than purplish.

Sisyrinchium albidum Raf. A single plant of this species was collected May 27th, 1889, by Miss Ellen Coit, of New London, in a field near the New London-Waterford line. It was probably a stray individual, introduced perhaps in seed. The plant was given to me in the fresh state, and since then has lain in my herbarium. Its identification has been verified by comparison with material at the Gray Herbarium.

Salix longifolia Muhl. This species was first reported from Connecticut by Mr. C. H. Bissell, who found it near Glastonbury beside the Connecticut River (Rhodora, IV, 99). It may be of interest also to note its occurrence farther down the river at Selden's Cove, where it is frequent on the sandy levels bordering the creek.

I am informed by Mr. M. L. Fernald that in the Herbarium of the Royal Gardens, Kew, there are two sheets of *S. longifolia* collected

by the late Joseph Barratt and marked: (1) "In arid sands, Chatham, 2 feet high, Barratt"; (2) "Chatham sands, opp. Middletown on the Banks of the River Connt. 1834, Sept. Barratt."

Salix pentandra L. A single small tree of this species grows close to the shore of the Connecticut River a short distance north of Hadlyme Ferry. Its surroundings make it probable that it is spontaneous at that point.

Maclura aurantiaca Nutt. is spontaneous along a roadside north of the railroad station at Waterford, having escaped from the adjoining grounds.

Rubus cuneifolius Pursh was found by the writer in Sept., 1902, in a pasture near the Lyman Viaduct in the northwestern part of Colchester. This is, I believe, the first report of its occurrence east of the Connecticut River.

Spiraea lobata Jacq. is well established in a low brushy lot near the roadside about one mile east of Groton ferry, having probably escaped from a neighboring garden.

Solidago Canadensis L. var. *glabrata* Porter. This form grows on the low sandy levels bordering Selden's Cove in Lyme, where it was discovered July 29, 1902, by Messrs. C. H. Bissell, L. Andrews and the writer. So far as I am aware it has not hitherto been reported from Connecticut. At the date mentioned it was just coming into bloom, a surprising fact when it is considered that *S. Canadensis* is one of our late flowering goldenrods. It would be interesting to know whether the flowering seasons of these two forms show normally such a divergence in time.

Lactuca Scariola L. and its var. *integrata* Grenier & Godron, were found by me in the summer of 1902 growing on filled land adjoining Pequot Ave., New London. The species with its pinnately lobed leaves is apparently rare. At this station it was much less abundant than the variety.

Bidens aristosa (Michx.) Britton. This western species has been detected at Norwich by Mrs. Elisha E. Rogers, and by the writer at South Windham and Lebanon.

For aid in verifying the determination of some of the plants noted above, I am under obligation to the authorities of the Gray Herbarium.

New London, Connecticut.

THE IDENTITY OF ANYCHIA DICHOTOMA.

B. L. Robinson.

The genus Anychia contains two easily recognizable although often confused species, both of which grow in New England. One of these, with fastigiately branched puberulent stems, lance-linear leaves, and numerous subsessile flowers, has long passed as *A. dichotoma*, Michx. The other, with more diffuse branching, elliptical leaves, and pedicillate flowers scattered in the forks, has according to varying ideas of specific lines and nomenclatorial principles been called *A. capillacea*, DC., *A. dichotoma*, var. *capillacea*, Torr., and *A. canadensis*, Britt., Sterns, & Poggenb. While recently in Paris, Mr. M. L. Fernald had an opportunity to examine the type specimen of Michaux's *A. dichotoma* and found it to be not, as generally supposed, the puberulent plant so called, but the glabrous diffuse one later characterized as *A. capillacea.* Mr. Fernald forwarded to the Gray Herbarium an excellent photograph of the type together with some notes and the suggestion that the literature of the two species should be re-examined in the light of this interesting discovery. When in London some weeks later Mr. Fernald also examined the extant specimen of the Linnaean *Queria canadensis*, and found it likewise to be the glabrous diffusely branched plant, and thus identical with the type of Michaux's *A. dichotoma.*

On turning to a copy of Michaux's Flora, long ago annotated by Dr. Gray, I find that he also had noticed the real identity of the Michauxian plant, as he had penciled the words "the capillacea" against the description of *A. dichotoma.* His note, however, was made at a time when in the broader interpretation of species, *A. capillacea* was regarded a mere form of *A. dichotoma.* Presumably for this reason he never published any mention of his observation on the type at the Jardin des Plantes.

It has long been clear, however, that our two Anychias are distinct species and it is a matter of interest to learn that Michaux's name *A. dichotoma* has been applied to the wrong one. In the light of the new information now at hand it will be necessary to change the names now current. Concerning the smooth diffusely branched plant, there can be no question. To those who use the first correct combination it must hereafter be *A. dichotoma*, Michx. Those, who

on the other hand prefer the earliest specific name, may continue to call the plant *A. canadensis*, Britt., Sterns, & Poggenb.

Concerning the other plant, namely the one with puberulent stems, the difficulty is greater. The only available names found in literature appear to be several of Rafinesque's, who in the Atlantic Journal[1] and New Flora[2] characterized no less than six species of Anychia, prefacing his treatment of the group in the latter publication by the following characteristic remarks: "The plants of this G[enus] and others akin forming a small natural group, have been blended with the G[enera] Queria, Paronychia, Achyranthus &c., their synonymy and sp[ecies] are in utter confusion. Having shown to Torrey 4 sp[ecies] widely different in habit, leaves and flowers! he pronounced them all varieties of *Queria canadensis*! They require as yet a monograph, and must be divided into 2 or 3 Genera by the stamens, that must all be examined again, since Michaux and Nuttal[l] differ about them. I regret that I did not examine all mine when met alive. Meantime I will divide them into 3 subgenera or Genera, and add some new species." *A. nudiflora*, Raf., is described as smooth and may be excluded from consideration on this ground. The other five, namely, *A. polygonoides*, *fastigiata*, *conferta*, *lateralis*, and *divaricata*, are all said to be puberulent or pubescent. Of these, the first published (if priority of position as well as of time be regarded) was *A. polygonoides*, which was characterized[1] as follows: "Stem dichotomous, lax, erect, puberulent; leaves patent, linear cuneate, acute, nearly smooth, stipules lanceolate; flowers solitary in dichotomy, subpedicellate, erect. From the mountains Alleghany, and estival like the three following [*A. fastigiata*, *conferta*, and *lateralis*], six inches high."

Every part of this description corresponds to the more loosely branched specimens of our puberulent-stemmed plant, and there can be no serious doubt that *A. polygonoides*, Raf., was what has long passed as *A. dichotoma*. Further proof, however, is to be found in a subsequent note[3] by Rafinesque, in which he states that his *A. polygonoides* is "*A. canadensis* of Nuttall and most of our botanists." This is significant, for at that time Nuttall, Torrey, De Candolle, and others had all mistaken the puberulent-stemmed plant for *Queria canadensis* of *L.* and *A. dichotoma* of Michaux., separating

[1] Atlantic Journal, i. 16 (1832). [2] New Flora, iv. 41–43 (1836).
[3] New Flora, iv. 43.

from it as a variety or independent species the smooth-stemmed and broader-leaved *A. capillacea*, DC. That Rafinesque himself had a correct knowledge of these plants is shown by his further remark [1] that "The *A. capillaris* N[uttall] is the real *A. dichotoma*, of Mx. quite distinct by broad leaves elliptic, stem filiform smooth."

The only points in the description of *A. polygonoides*, which can raise any question, are the lax branching and subpedicellate flowers, but it must be remembered that Rafinesque employed these expressions only in a comparative way while endeavoring to separate several forms of the same plant, all regarded by Dr. Torrey as *Queria canadensis*. Fortunately authentic specimens of Rafinesque's Anychias were preserved in the Torrey Herbarium, and we have recent and critical authority in Dr. Britton's notes on the genus [2] for regarding *A. polygonoides*, Raf., as identical with the puberulent plant.

The species of Anychia should therefore stand as follows. As from habital similarity they have been much confused, it seems best to cite specimens as well as synonymy pretty fully.

A. dichotoma, Michx. Stem filiform, glabrous: leaves elliptical, thin: inflorescence diffuse; flowers distinctly pedicellate. — Fl. Bor.-Am. i. 113 (1803); Raf. New Fl. iv. 43. *Queria canadensis*, L. Sp. 90 (1753). *Q. dichotoma*, Moench, Meth. 351 (1794). *Q. capillacea*, Nutt. Gen. i. 159 (1818). *Q. canadensis*, var. *capillacea*, Eaton, Man. ed. 4, 422 (1824). *Q. canadensis*, var. *capillaris*, Britton, Bull. Torr. Bot. Club, xiii. 187 (1886). *Anychia dichotoma*, var. *capillacea*, Eaton, Man. ed. 6, 295 (1833). *A. capillacea*, DC. Prodr. iii. 369 (1828); Redfield, Bull. Torr. Bot. Club, vi. 61; Britton, ibid. xiii. 187; Wats. & Coult. in Gray, Man. ed. 6, 426. *A. capillaris*, Raf. (by clerical error), New Fl. iv. 43. *A. filiformis*, Raf. acc. to Britton, l. c. *A. canadensis*, Britt., Sterns, & Poggenb. Prelim. Cat. N. Y. 44 (1888); Britt. & Brown, Ill. Fl. ii. 40; Britt. Man. 405.— New Hampshire: Nottingham, 20 July, 1900, *A. A. Eaton*. Vermont: Bellows Falls, 22 Aug. 1902, *Blanchard*; Pownal, 23 July, 1898, *Eggleston*; North Pownal, 11 Aug. 1902, *Blanchard*. Massachusetts: Danvers, 5 July, 1896, *Sears*; Melrose, 27 Sept. 1882, *Perkins*; on gravel, Pine Hill, Middlesex Fells, 21 July, 1895, *Charles Eliot*; Medford, 3 Aug. 1878, *Perkins*; damp rocky woods, Woburn, 28 July, 1895, *Rich*; sandy soil, Cambridge, 11 Sept. 1891, *Fernald*; on Snake Hill, Waltham, 13 Aug. 1866, *W. Boott*; Blue Hills Reservation, 11 Aug. 1894, *Manning*; roadside in shade, Sharon, 12 July, 1896, *Williams*; Highland Grove, Walpole, 20 Aug. 1878, *Young*. Rhode Island: *Thurber*; Diamond Hill,

[1] New Fl. iv. 43. [2] Bull. Torr. Bot. Club, xiii. 187.

20 Sept. 1884, *W. W. Bailey.* Connecticut: in shade, not rare, Southington, *Andrews*, no. 797; woods, Southington, 15 Aug. 1901, *Bissell*; Pomfret, 4 July, 1901, *Driggs.* New York: Staten Island, 1855, *Thurber.* Pennsylvania: Lancaster near Binkley's Bridge, 6 Sept. 1901, *Heller*; Allegheny, in hilly woods, *Ziegler.* District of Columbia: wooded hillsides near Washington, 30 Jun. & 16 July, 1896, *Steele.* Maryland: in hb. Gray without locality. Virginia: along the New River, Blue Bridge, 12 July, 1892, *Small*; Stony Man Mountain, *Steele*, no. 73. North Carolina: Asheville, *Robinson*, no. 32; dry slopes, Buncombe County, *Biltmore distribution*, no. 5419a. Kentucky: Harlan Court House, *Kearney*, no. 10. Ohio: Perkins, 8 July, 1895, *Moseley.* Ontario: Essex County, 1891, *Dearness*; Leamington, 30 July, 1892, *Macoun.* Illinois: Lansing, *A. Chase*, no. 863; Rock River, *Bebb.* Minnesota: on red bluffs of the upper Des Moines River, *Geyer.*

A. polygonoides, Raf. Stem puberulent: leaves lance-linear, of firmer texture: inflorescence lax to fastigiate; flowers scarcely or not at all pedicelled.— Atl. Journ. i. 16 (1832). *A. canadensis*, Ell. Sk. i. 307 (1817), as to pl. descr. but not as to syn. *Queria canadensis. A. dichotoma*, DC. Prodr. iii. 369; Torr. & Gray, Fl. i. 172; Gray, Man. eds. 1–6; Britton, Bull. Torr. Bot. Club, xiii. 186; Britt. & Brown, Ill. Fl. ii. 40; Britton, Man. 405; not Michx. *Queria canadensis*, Nutt. Gen. i. 158 (1818). *A. fastigiata, conferta*, & *lateralis*, Raf. Atl. Journ. i. 16 (1832), from char. and acc. to Britton, Bull. Torr. Bot. Club, xiii. 187. *?A. divaricata*, Raf. New Fl. iv. 42 (1836). *Paronychia canadensis*, Wood, Bot. and Flor. 58 (1870). — Massachusetts: Danvers, 14 Aug. 1887, *Sears*; W. Quincy, on wood roads, 11 Sept., 1894, *Rich*; road east of Great Dome, Blue Hills, *Manning.* Connecticut: on railroad track, Norwalk, 6 Aug. 1894, *Averill.* Pennsylvania: roadsides near the Delaware Water Gap, Oct. 1867, *C. F. Austin*; Safe Harbor, *Heller & Halbach*, no. 656; Allegheny, 21 July, 1889, *Ziegler.* District of Columbia. Washington and vicinity, 17 Sept. 1896, *Steele.* Virginia: Bedford County, 11 July, 1871, *Curtiss*; Massanuttin Mountain, *Heller & Halbach*, no. 1090; Stony Man Mountain, 30 Aug. 1901, *Steele*, nos. 72, 242. North Carolina; Cullowhee, 1887, *Thaxter*; Asheville, *Robinson*, no. 30. Florida: brackish shores, Duval County, *Curtiss*, no. 337 (form with exceedingly short puberulence, the sepals more conspicuously ciliated). Alabama: ex herb. J. Torrey; dry rich soil, 1858, ex herb. Dr. Short. Tennessee; upon woods, Henderson, *Bain*, no. 239. Kentucky: Poor Fork, *Kearney*, no. 198. Ohio: Oxford, 6 Aug. 1895, *Moseley.* Illinois: Mt. Carmel, 1875, *Dr. Schneck.* Arkansas: sandy fields, *Harvey*, no. 16. Kansas: open woods, Cherokee County, *Hitchcock*, no. 801. Texas: Dallas, June, 1873, *Reverchon.* Arizona (or New Mexico): *S. B. Parish*, no. 310.

Gray Herbarium.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,— XIV.[1]

Alfred Rehder.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

Cornaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Cornus alternifolia, L. f.	+	+	+	+	+	+
" Amomum, Mill.	+	+		+	+	+
" canadensis, L.	+	+	+	+	+	+
" circinata, L'Hér.	+	+	+	+	+	+
" florida, L.	—	—	+	+	+	+
" paniculata, L'Hér.	+	+	+	+	+	+
" " × Purpusi				+		
" Purpusi, Koehne.		+	+	+	+	+
" stolonifera, Michx.	+	+	+	+		+
Nyssa sylvatica, Marsh.	+	+	+	+	+	+

Caprifoliaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Diervilla Lonicera, Mill.	+	+	+	+	+	+
Linnaea borealis, L.	+	+	+	+		+
Lonicera canadensis, Marsh.	+	+	+	+		+
" coerulea, L.	+	+	+	+	+	+
" dioica, L.	+	+	+	+	+	+
" hirsuta, Eat.			+	—		
" japonica, Thunb.						+
" Morrowii, Gray				+		
" oblongifolia, Hook.	+		+			
" sempervirens, L.	+			+	+	+
" tatarica, L.	+		+	+		+
" Xylosteum, L.					+	
Sambucus canadensis, L.	+	+	+	+	+	+
" racemosa, L.	+	+	+	+	+	+

[1] Printed in Rhodora as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Symphoricarpus orbiculatus, Moench.				+	+	
" racemosus, Michx.	+	+	+	+	+	
" " var. pauciflorus Robbins . . .			+	+		
Triosteum angustifolium, L.						+
" aurantiacum, Bickn.	+	+	+	+	+	+
" perfoliatum, L.						+
Viburnum acerifolium, L.	+	+	+	+	+	+
" alnifolium, Marsh.	+	+	+	+	+	+
" cassinoides, L.	+	+	+	+	+	+
" dentatum, L.	+	+	+	+	+	+
" Lentago, L.	+	+	+	+	+	+
" nudum, L.						+
" Opulus, L.	+	+	+	+		+
" pauciflorum, Pylaie	+	+	+			
" prunifolium, L.						+
" pubescens, Pursh.			+			+
" venosum, Britton				+		

Notes on the above List.

Cornus Purpusi, Koehne [1] is a recent segregate of *C. Amomum* Miller (*C. sericea*, L.) and was first described from plants raised in Germany from seeds collected near Toledo, Ohio, by C. A. Purpus. It is chiefly distinguished from *C. Amomum* by the numerous papillae on the epidermis on the under side of the leaves which appears therefore glaucous, while in *C. Amomum* the epidermis is perfectly smooth and the color of the under side usually green. Other characters of *C. Purpusi* are the generally narrower leaves, cuneate at the base and with only 4 to 5 or rarely 6 pairs of veins usually furnished with pale pubescence, the smaller flowers and inflorescence and its more appressed pubescence, the paler color of the branches, the but slightly ribbed stone and the usually much paler often almost whitish fruit. The habit of the shrub is looser and especially the more or less pendulous leaves give it a distinct appearance from *C. Amomum* which has broader leaves with 4 to 8 pairs of veins and a usually rounded base and stouter petioles. *Cornus Purpusi* ranges from

[1] Gartenfl. **48**: 338 (1899); Mitt. Deutsch. Dendr. Ges. **12**: 48 (1903); Rehder in Sargent's Trees & Shrubs **1**: 77, pl. 40 (1903).

New England westward through the Lake region and the Central States, while *C. Amomum* is strictly Alleghanian. In New England both species occur and intermediate forms are occasionally met with.

Cornus paniculata × *Purpusi* = *C. Arnoldiana*, Rehder[1] is a hybrid which originated spontaneously in the Arnold Arboretum. As the two parent species grow not unfrequently together in New England, it is to be expected that this hybrid will be found elsewhere. It is probably best described as a *Cornus paniculata* with the branches of last year purplish instead of grayish.

Cornus stolonifera has been reported from Rhode Island, but the only specimen I have seen under this name from that state proved to be *C. Amomum*.

Linnaea borealis. The American plant has been distinguished from the type which occurs in Europe and Northern Asia as *L. borealis*, var. *americana* (*L. americana*, Forbes). It is, however, hardly specifically distinct as considered by Britton in his Manual. The only locality known in Rhode Island where it had been collected by S. T. Olney has long been obliterated (see Rhodora **2** : 218).

Lonicera canadensis. This species is better known under the name *L. ciliata*, Muhlenberg, but since Marshall's name is about 30 years older and the species is recognizable from his description, it has to supersede Muhlenberg's later name.

Lonicera coerulea. The American plant, at least that of northeastern North America, belongs to *L. coerulea*, var. *villosa*, Torrey & Gray, which varies greatly in the pubescence and shape of the leaves. It is chiefly distinguished from the type by its more or less upright winter buds and the glabrous campanulate corolla.

Lonicera hirsuta. The only specimens I have seen from the New England states were collected near Middlebury, Vermont, by E. Brainerd. No specimen from the type locality, which is Williamstown, Mass., could be found in any of the herbariums consulted. At the time of its discovery by Eaton, about 85 years ago, it seems to have been plentiful there, for he says in his Manual (ed. 6, p. 210) that two miles west of Williams College he saw "hundreds in flower climbing the trees and shrubs of an elevated ridge or hill in the summer of 1817." If the wood where Eaton found it has not entirely disappeared, the plant probably still exists there and a thorough search at the flowering time, about middle of June, in the region

[1] Rehder in Sargent's Trees & Shrubs **1** : 79, pl. 39 (1902).

described might lead to the rediscovery of this species at its type locality. Eaton also mentions that it had been found later near Worcester, Mass., and Middlebury, Vermont. At the latter locality it was rediscovered by E. Brainerd in 1880 (Herb. Univ. Vermont).

Lonicera oblongifolium. Specimens under this name from Rhode Island collected by W. W. Bailey near Olneyville proved to be the European *L. Xylosteum.*

Lonicera japonica, *L. Morrowii*, *L. sempervirens*, *L. tatarica*, and *L. Xylosteum*, also *Symphoricarpus orbiculatus*, Moench (*S. vulgaris*, Michaux) have been found escaped from cultivation and well established. As several of them have maintained themselves for a considerable time and are spreading and those which have been observed but recently will in all probability do likewise, they ought not to be omitted from an account of the flora of New England. *L. japonica* which is, according to Mr. C. H. Bissell, a not uncommon escape along the coast of Connecticut was found last year also in Massachusetts by Mr. L. A. Wentworth of Lynn who informs me that he discovered at Essex a large number of plants of this species along a roadside some distance from any habitation.

Sambucus racemosa. The American plant is often considered a distinct species, *S. pubens* Michaux (*S. racemosa*, var. *pubens*, Koehne), chiefly distinguished by its pubescence from the glabrous European type.

Triosteum perfoliatum. This species seems to occur only in Connecticut; all specimens from other states I have seen proved to be *T. aurantiacum.*

Viburnum alnifolium. From Rhode Island I have seen no specimen but one from S. F. Olney's herbarium (Herb. Brown Univ.) As this had been collected probably about 60 years ago, the locality may now possibly be obliterated.

Viburnum nudum has been found only in Connecticut. All specimens from other states named *V. nudum* which I have seen, belonged to *V. cassinoides.*

Viburnum Opulus. From the European type the American plant differs chiefly in the open shallow groove and the smaller more numerous glands of the petiole and in the orange red, not scarlet fruit. It has been distinguished as *V. americanum*, Miller (*V. Opulus*, var. *americanum*, Aiton).

Viburnum prunifolium. Besides the type there has been found in

Connecticut near Greenwich, a form with smaller globose fruits, *V. prunifolium*, var. *globosum*, Nash (Herb. C. H. Bissell).

Viburnum pubescens. As this species occurs in Vermont and Connecticut, it may be looked for in western Massachusetts. It has been reported but probably erroneously from New Hampshire (W. S. Harris, Flora of the town of Windham, p. 17). A specimen I received as *V. pubescens* from New Hampshire (Herb. Dartmouth Coll., Hanover) proved to be *V. acerifolium.*

Viburnum venosum. Under this name Britton has recently separated the northern form of *V. molle* of Gray (*V. scabrellum*, Chapman) from the form of the southern states which he takes for the type. Though the morphological characters by which the two species are distinguished appear rather slight, both are quite distinct in their general appearance and seem really less closely related to each other than *V. venosum* is to *V. dentatum.* As regards the name *V. molle* which has been left to the southern form, a closer study of the matter has led me to the conviction that *V. molle* of Gray and subsequent authors is not the *V. molle* of Michaux, but the *V. dentatum*, var. *semitomentosum*, Michaux, while the typical *V. molle*, Michaux, is identical with the species recently described as *V. Demetrionis.* Although *V. molle*, Gray, if *V. venosum* is considered a distinct species, is not included in the flora of New England, I suppose it will not seem out of place to insert here the following notes intended to make clear the somewhat confused synonymy of *V. molle*, especially as it will show conclusively that the name *V. molle* can never be used for the New England plant.

Viburnum molle, Michaux, Fl. **1** : 180 (1803). *V. Demetrionis*, Deane & Robinson, Bot. Gaz. **22** : 167, pl. 8 (1896); **24** : 436 (1897); Britton & Brown, Ill. Fl. **3** : 231, fig. 3441 (1898); Britton, Man. 871 (1901).

This species has been found only in Kentucky and Missouri.

It had always seemed improbable to me that Michaux really should have considered one and the same species, even if represented by somewhat different forms, as a variety of *V. dentatum* and also as a distinct species allied to *V. Opulus*, and as furthermore the description of *V. molle*, Michaux, did not fit very well the *V. molle* of Gray, I concluded to follow the matter up. Mr. Fernald to whom I spoke about it before he left for Europe last summer, kindly promised me to look up the species in Michaux's herbarium. He brought back a

good photograph of Michaux's type which enabled me, almost as well as if I had had the specimen itself, to study the characters of *V. molle*; a close examination made it soon apparent that it could not be identical with *V. molle* of Gray, as the petioles are stipulate and the venation and serration of the leaves perceptibly different. Of the species with stipulate petioles *V. Demetrionis* seemed to be the most similar and indeed its deeply cordate leaves and their venation and serration agrees perfectly with Michaux's specimen; also Michaux's description, especially as regards "fructibus oblongo-ovatis" and "cortice quotannis laceratim deciduo" fits *V. Demetrionis* exactly, but not at all *V. molle* of Gray. Michaux also apparently observed the stipules and for this reason characterized it as a "V. Opulus foliis indivisis." To make the evidence conclusive the *V. molle* has been recently rediscovered at the type locality, Danville. Kentucky, by Mr. Boynton of Baltimore and Mr. C. D. Beadle remarked in a letter regarding this discovery that the specimen look much like *V. Demetrionis* and that Michaux's description likewise agrees very well with that species. A specimen which he sent a short time afterwards to the Arnold Arboretum leaves no doubt that Boynton's specimen is identical as well with Michaux's *V. molle* as with *V. Demetrionis.*

VIBURNUM BRACTEATUM, Rehder in Sargent's Trees & Shrubs **1**: 135, pl. 68 (1903). *V. molle*, Chapman, Fl. ed. 3. 190 (1897), not Michaux.

This species is known only from the cliffs of the Coosa River near Rome, Georgia. It differs from *V. molle* chiefly in its conspicuous bracts, the semiorbicular calyx teeth, the shorter petioles, the remotely and shallowly dentate leaves and the close bark.

VIBURNUM **semitomentosum**, comb. nov. *V. dentatum β semitomentosum*, Michaux, Fl. **1**: 179 (1803). *V. dentatum β? scabrellum*, Torrey & Gray, Fl. **2**: 16 (1841). *V. scabrellum*, Chapman, Fl. 172 (1860). *V. molle*, Gray, Man. ed. 5, 206 (1867); Syn. Fl. **1**, **2**: 11, in part (1884); Britton & Brown, Ill. Fl. **3**: 231, in part, fig. 3440 (1898); Dippel, Handb. Laubholzk. **1**: 184, in part (1889); not Michaux. *V. molle*, var.? *tomentosum*, Chapman, Fl. ed. 3, 190 (1897).

This species is distributed from Kentucky to Florida and Texas. It differs from *V. venosum* by the thinner and fewer veins, the shallower often crenate dentation with fewer and larger obtusish teeth, the oval or ovate rarely orbicular leaves generally truncate at the

base, the larger flowers and fruits and the reddish brown branches. Gray quotes "*V. dentatum semitomentosum* Michx., in part" as well under his *V. molle* as under *V. pubescens* and refers to the latter species, Michaux's specimens from Lake Champlain, but as Michaux himself excludes those specimens from his var. *semitomentosum* and quotes in his Flora as locality only "in Carolinae inferioris dumetosis," it seems hardly correct to quote part of his var. *semitomentosum* as synonymous with *V. pubescens*.

Viburnum venosum, Britton, Man. 871 (1901); Rehder in Sargent's Trees & Shrubs 1:85, pl. 43 (1903). *V. molle*, Gray, Syn. Fl. **1**, 2:11, in part (1884); Dippel, Handb. Laubholzk. 1:184, fig. 115, in part (1889); Watson & Coulter in Gray, Man. ed. 6, 218, in part (1890); Sargent, Gard. & For. **4**:29, fig. 8 (1891); Zabel, Möller's Deutsch. Gärtn.-Zeit. **6**:267, fig. (1891); Koehne, Deutsch. Dendr. 537 (1893); not Michaux. *V. Hanceanum*, Dippel, l. c. 176, fig. 107 (1889), not Maximowicz.

This species ranges from eastern Massachusetts to Pennsylvania and Delaware, and reappears in a peculiar form in S. Carolina. It differs from the preceding species chiefly in the more numerous and more prominent veins, the acute callous-tipped and more numerous teeth, the generally subcordate leaves, glabrous or nearly so above, those below the inflorescence suborbicular, the smaller flowers and fruits and the grayish or yellowish brown branches. In European gardens it has long been in cultivation and is occasionally met with as *V. pubescens*, *V. nepalense* and *V. asiaticum*. The two following varieties merit distinction.

V. venosum, var. **Canbyi**, var. nov. Differs from the type by its thinner, less pubescent leaves, often only pubescent along the midrib beneath, especially those below the inflorescence much larger, often 5 to 8 cm. broad and the larger inflorescence like the young branchlets only slightly pubescent. This is apparently the form mentioned by Torrey & Gray in their Flora as intermediate between *V. dentatum* and *V. dentatum scabrellum*. Some remarks regarding the pubescence in the description of *V. dentatum* by Darlington [1] and by Beck [2] refer probably also to this form.— Delaware, Wilmington, July 2 and Aug. 22, 1902, Christiana, Aug. 25, 1902, New Castle, July 2, 1902, *W. M. Canby*. Pennsylvania, Westchester, Oct. 8,

[1] Fl. Cestr. ed. 2, 203 (1837).

[2] Bot. U. S. 145 (1856).

1902, *W. M. Canby*, Mt. Hope, June 24, 1901, *A. A. Heller.* S. W. Virginia, July 16, 1892, *J. K. Small.* This form has been for many years in cultivation at the Arnold Aboretum, where it was received under the name *V. laevigatum* from the nursery of Parsons & Son, Flushing, Long Island. As an ornamental shrub it is superior to *V. dentatum* and *V. venosum* on account of its larger corymbs and larger dark green foliage and more vigorous habit.

V. venosum, var. **longifolium**, comb. nov. *V. dentatum*, var. *longifolium*, Dippel, l. c. 183 (1889); Koehne, Deutsch. Dendr. 537 (1893). *V. longifolium*, "Loddiges" Zabel. in Beissner, Schelle & Zabel, Handb. Laubholz-Ben. 441 (1903). This form known only in cultivation differs in its narrower and longer leaves, pubescent on both sides, more densely beneath, with single or forked hairs. In the plant cultivated at the Arnold Arboretum the inflorescence and the young branchlets are glabrous, but as Dippel and Koehne say that they are either glabrous or pubescent, I am inclined to refer here a Viburnum collected by Dr. Mellichamp in 1878 near Bluffton, S. C. (herb. Gray) which has the inflorescence and the young branchlets stellate-tomentose, but agrees otherwise with the cultivated plant.

Arnold Arboretum.

NOTES ON PUBLICATIONS RECENTLY RECEIVED.

Professor T. C. Porter's long expected (now alas posthumous) Flora of Pennsylvania is at hand,[1] having been edited and provided with analytical keys by Dr. J. K. Small, the nephew of author. The work is an excellently printed royal octavo volume of 362 pages enumerating no less than 2201 species. It is restricted to the spermatophytes and the sequence of orders and families is essentially that of Engler & Prantl's Natürlichen Pflanzenfamilien. However, several departures from this arrangement are made, and not always with happy results. Thus the *Compositae* are divided, as by several recent writers, into three families, the *Cichoriaceae*, *Ambrosiaceae*, and *Compositae*. About the practical value of this division there will of course be a difference of opinion, but if it is made, there would certainly

[1] Flora of Pennsylvania by Thomas Conrad Porter, D. D., LL. D. Ed. by John Kunkel Small, Ph. D. Ginn & Co., Boston, 1903.

seem to be no reason for inverting the sequence and placing the *Cichorieae* before, *i. e.* below the *Compositae* proper. It is one of the cardinal principles of the modern and very philosophic German system of plant arrangement, that the complex shall come after the simple, as having in all probability developed subsequently. Now, it cannot be doubted that a highly zygomorphic corolla such as is found in the *Cichorieae*, is a more complicated structure in the sense of being a wider departure from primitive simplicity, than is the regular corolla of the *Eupatorieae*, etc. It is easy to believe that the asymmetrical corolla of the *Cichorieae* has arisen from the more common regular form by a gradual one-sided splitting, but it is quite difficult to conceive that the highly zygomorphic corolla was the primitive form. It should be remembered also that the *Cichorieae*, provided as they are with an elaborate latex system, have a more complex anatomy than the other *Compositae*, which is an added reason for considering them of later development.

The nomenclature and delimitation of groups is in conformity with the practice of the school of botany which has been called the "Neo-American." This will naturally be a matter of regret to many of Dr. Porter's friends, who perceive that even after ten years' trial by some American botanists the Rochester nomenclature is no nearer acceptance by the great European systematists. One of the alleged merits of the reform system applied in Dr. Porter's flora is, we believe, its consistency, yet in turning the pages one is struck with obvious incongruities. For instance, many well established names have been discarded on account of the so-called doctrine of homonyms, yet *Cornus candidissima*, Marsh. (1785) is maintained quite without regard to the earlier *C. candidissima*, Mill. (1769). Erysimum is kept up as a good genus resting upon the last of its four Linnaean species, yet Stellaria, which if similarly treated would have to rest upon *S. cerastioides* and to stand for what is now called Cerastium, is wholly suppressed and the genus Cerastium although of later publication is allowed to stand. *Agrimonia striata*, a name which Michaux gave to a Canadian plant, is arbitrarily transferred to a species ranging from Connecticut southward. It is needless to multiply such examples. Those here mentioned are selected because they have all been previously and quite without effect called to the attention of the reform school. A small slip in authority, originating doubtless in a typographical error, but handed on from publication

to publication, is that of ascribing *Melilotus alba* to Desvaux instead of Desrousseaux its real author. The local distribution of each species and variety within the limits of Pennsylvania is stated with remarkable completeness and unquestioned accuracy, but the same cannot be said for the more general ranges given. This is, of course, a secondary feature in a local flora, and therefore some incompleteness or slips in stating extra-limital ranges should be readily condoned, yet surely surprise must be felt when a plant so noteworthy and so much discussed as our dwarf mistletoe is assigned a range which does not include a third part of the territory over which it is known to extend. However, notwithstanding the defects here mentioned, the work as a whole is a noble monument of untiring and lifelong effort to understand thoroughly and record accurately a rich and interesting flora. Dr. Small's addition of keys contributes a feature which must have cost no inconsiderable labor and will be appreciated by those who use the book in the field.

Under the title Contributions from the Ames Botanical Laboratory, No. 1, Mr. Oakes Ames has just issued a valuable and well illustrated paper on some orchids of southern Florida. The observations relate chiefly to specimens recently collected by Mr. A. A. Eaton. It is to be hoped that this carefully prepared paper is the forerunner of an extended series of similar contributions concerning a family of plants long in need of an American specialist.

Dr. W. F. Ganong in the Educational Review of St. John, New Brunswick, xvii. 196, has published an excellent article upon plant-nomenclature.

Bulletin 103 of the Vermont Agricultural Experiment Station, a joint publication by Professor L. R. Jones and other members of the staff, deals with the Maple Sap Flow. Although it contains much tabular matter, embodying the results of extensive experimentation, the whole subject is clearly discussed in language so free from technicalities that the bulletin will be a practical and valuable guide to maple sugar makers, not only in Vermont but throughout the range of the industry. — B. L. R.

Meeting of the Vermont Botanical Club.— The ninth annual winter meeting of the Vermont Botanical Club was held at Burlington January 21–22, with President E. Brainerd in the chair. The follow-

ing papers were read: — Wild Flowers of California, Mrs. H. F. Grout; Fruiting Season of the Hair-cap Moss, Miss P. M. Towle; The Brandon Nature Club, Miss C. W. Ormsbee; Ferns of Greensboro, Miss H. M. Hodge; Progress of Nature Study in the Vermont Schools, Supt. W. E. Ranger; A School-garden in its relation to Nature Study, Miss S. T. Palmer; A Trip to the Farallone Islands, Mrs. E. B. Davenport; Soil as a Factor in Plant Distribution, Professor W. J. Morse; Flow of Sap in the Sugar Maple, Professor L. R. Jones; The Importance of the Study of Plants when in Fruit, President E. Brainerd; New Plants added to the Flora of Burlington, Mrs. N. F. Flynn; Work of the Fairbanks Museum, Miss D. I. Griffin; On Goldie's Fern and on the Ginseng, F. A. Balch; Ferns in the vicinity of St. Johnsbury, Miss B. M. Rooney; On the Shrubby Cinquefoil, A. H. Gilbert; Botanical Prizes in connection with School work, A. J. Eaton; A Small Matter of Color, Miss S. H. Bliss; Poisonous Plants of Vermont, W. W. Gilbert; The Pogonias about Burlington, F. A. Ross. The annual address was given by Dr. Marshall A. Howe of the New York Botanical Garden and was entitled Plant Life of the Sea. This exceedingly interesting lecture was illustrated by more than a hundred exquisitely colored photographs prepared by the late Cornelius Van Brunt and projected by stereopticon. The officers of the Club were unanimously re-elected and a new executive committee created. As in former years the Club met simultaneously with the Vermont Bird Club and during some of the exercises the two clubs sat in joint session. A very pleasant feature of the meeting was a supper at "The Heights" at which about forty members and guests assembled. It was decided to hold the summer meeting at Lake Dunmore, on the 12th and 13th of July.

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THE NORTH AMERICAN ALLIES OF SCIRPUS LACUSTRIS.

Agnes Chase.

(Plates 52 and 53.)

In the hope of clearing up confusion in regard to our Great Bulrush the accompanying plates have been prepared and the following descriptions drawn up after study of the specimens of this group in the National and Gray Herbaria, herbaria of the New England Botanical Club and of the Field Columbian Museum, and in a few private herbaria.

Scirpus validus was clearly described by Vahl and this name was taken up by the earlier American botanists. From the brief description of *S. lacustris* in Species Plantarum (p. 48) it is impossible to decide which species of the group Linnaeus had in mind, but the type locality is given as "Europae," and the descriptions of *S. lacustris* L. by Kunth (Enum. Pl. **2**: 164), Vahl (Enum. Pl. **2**: 268), and Reichenbach (Icones Fl. Germ. **7**: 41, plate 106) clearly describe the specimens with 3-cleft styles from Scandinavia, Germany and France found in the above herbaria. This European *S. lacustris* is a plant with spikelets usually in capitate clusters; smooth scales (the excurrent tip of the midrib alone being scabrous) one-fourth or more longer than the achene; style 3-cleft; achene 1.7–1.8 by 3 mm., triquetrous, the ventral facet broadest and the dorsal angle obtuse; and the involucral bract flat or plano-convex, the margins scabrous. The European bulrush with 2-cleft style, described as *S. Tabernaemontani* Gmel. Fl. Bad. **1**: 101, and figured in Reichenbach's Icones (**7**: 41, plate 107), is, to judge from descriptions, plate and numerous speci-

mens in the Gray Herbarium, clearly distinct from *S. lacustris* L., though reduced to synonymy in the Kew Index. To this form our American *S. validus* and *S. occidentalis* are more nearly allied than to *S. lacustris* L.

The achene-characters here given are based on study of mature plants; and achenes for measurement and illustration are in each case taken from the lower part of the spikelet, the upper achenes being found less characteristic and almost invariably smaller than the lower ones.

Key to American Allies of Scirpus lacustris.

Achene lenticular, style 2-cleft:
  Bristles 4–6, slender:
    Achene 2 mm., scales but little longer . . . *S. validus.*
    Achene 2.5–3 mm., scales ¼–⅓ longer . . . *S. occidentalis.*
  Bristles 2, broad, ciliate below . . . . . . *S. Californicus.*
Achene triquetrous, style 3-cleft; bristles 2–4, fragile, unequal . . . . *S. heterochaetus.*

Scirpus validus Vahl Enum. Pl. **2**: 268 (1806).

Scirpus lacustris of American authors not Linnaeus.

Perennial: rootstock horizontal: culm erect, 1.2–2.5 m. high, 0.8–2.5 cm. in diameter at base, attenuate upward, terete, soft, usually flattened in dried specimens, light green, smooth, minutely striate, leafless, or the basal sheaths produced into narrow acuminate blades (1–15 cm. long); sheaths membranaceous with a hyaline border and ligule, usually lacerate: inflorescence a decompound, lax, one-sided, more or less drooping umbel of numerous spikelets subtended by a single erect, attenuate, terete bract, channeled only at the base (1–6 cm. long); rays 1–6 cm. long, slender, plano-convex, the margins scabrous; bractlets vaginate, light brown to chestnut, acute or acuminate scarious, pubescent toward the summit, fimbriate-ciliate, the midrib excurrent into a scabrous tip; secondary rays 0.5–4 cm. long, slender: spikelets usually solitary or in capitate clusters of 2–3 (rarely 4 or 5) ferruginous to chestnut, ovoid to oblong-ovoid, acute or becoming obtuse as terminal achenes mature, 3–4 by 5–10 (usually 7) mm.: scales equalling or slightly longer than the achenes and rounded over them, broadly ovate or nearly orbicular, obtuse or emarginate, spotted with chestnut or purplish brown, pubescent along the midrib and at the summit with thick stubby hairs, ciliate; the strong green or pale midrib exserted into a short scabrous tip: bristles 4–6 (usually 6) shorter, equalling or longer than the achene (usually slightly longer), reddish brown, retrorsely barbed: style 2-cleft to

near the base: achene fuscous or grayish black when fully ripe (flavescent before maturity often falling without turning dark), rounded obovoid, abruptly mucronate, 1.3–1.5 by 2 (rarely 2.2 or less than 2) mm., in section plano-convex, or the ventral side slightly convex above, hexagonally reticulate under a lens.

Type locality: "Habitat in Caribaeis."

Specimens examined. NOVA SCOTIA, Halifax (*Howe & Lang* 1602): ONTARIO (*Macoun* 34,583): MANITOBA (*Bourgeau*): MAINE, Fort Fairfield (*Fernald* 2091); Marshfield (*Fernald*); Cumberland Co. (*Ricker* 323); Monmouth (*Merrill* 1133); New Sharon (*Knowlton*); Sumner (*Parlin*); Wells (*Furbish*); South Chesterville (*Eaton*): NEW HAMPSHIRE, Pelham (*Knowlton*); Jaffrey (*Robinson* 327): VERMONT, Shelburne Pond (*Flynn*); Manchester (*Day* 200): MASSACHUSETTS, East Gloucester (*Swan*); Malden (*Collins*); Westford (*Manning*); Cambridge (*Perkins*); Pittsfield (*Hoffmann*): RHODE ISLAND, Providence (*Regester & Collins*): CONNECTICUT, Southington (*Andrews* 425, *Bissell* 895); East Haven (*Winton*): NEW YORK (*Lucy* 2225, *Millspaugh*): PENNSYLVANIA (*Heller*): VIRGINIA (*Small*): NORTH CAROLINA (*Coville* 57, *Vasey*): SOUTH CAROLINA (*Ravenel*): GEORGIA (*Harper* 160, 575): FLORIDA (*Simpson* 373, *Nash* 1262, *Biltmore Herb.* 3310): TEXAS (*Bigelow*, *Reverchon* 889): OHIO (*Selby* 321, *Young*): INDIANA (*Hill*, *Deam*, *Umbach*, *Young*): ILLINOIS (*M. S. Bebb*, *Stewart*, *V. H. Chase*, *A. Chase* 1136, 1677): MICHIGAN (*Clarke*, *Davis*, *Houghton*, *H. H. & D. R. Camp*): WISCONSIN (*Umbach*): MINNESOTA (*Mearns* 695, *Pammel* 437): IOWA (*Butler* 4, *Cratty*, *Fitzpatrick*, *Ball*, *Shimek*): KANSAS (*Shear* 239, *Norton* 549): NEBRASKA (*Clements* 2586, *Rydberg* 1276, 1388 in part — Nat. Herb. no. 210,395): MONTANA (*Shear* 397, *Rydberg* 2148, 3168): WYOMING (*A. Nelson* 454, 3651, 7605): COLORADO (*Wolf & Rothrock* 930, *Crandall* 510): ARIZONA (*MacDougal* 538): WASHINGTON (*Whited* 584, *Horner* 512): CALIFORNIA (*Orcutt*, *Heller* 5827): PORTO RICO (*Heller* 6290, *Sintenis* 3846): CUBA (*Wright* 713).

Scirpus validus Vahl is distinguished from *S. lacustris* L. by the 2-cleft style; by the lenticular achene ⅔ as large as that of *S. lacutris;* by the scales equalling or but little larger than the achenes, pubescent along the midrib and at the summit; and by the terete involucral bract.

This species shows comparatively little variation, the most notable being that of the Florida, West Indian and Yucatan specimens and *MacDougal 538* from Arizona, which have scales longer and more pubescent, and bristles nearly or quite ⅓ longer than the achenes. As the type locality of *S. validus* is "in Caribaeis" it may be assumed that these subtropical specimens are the typical form, but the more

northern form is too close to it to be separated even as a variety. The achenes (excluding the bristles) are indistinguishable. Two specimens in the Gray Herbarium indicate a remarkable range for *S. validus*, or a very closely allied species. *Aitchinson 465* and *689* from Afghanistan have the lax, drooping umbel of ferruginous spikelets and the general aspect of *S. validus*. The style is 2-cleft, the achenes, not fully mature, are flavescent, 2.1 mm. long, rounded obovate. The scales furnish the only distinction; these are minutely pubescent along the midrib and at the summit with soft appressed hairs, not thick and stubby as in *S. validus*.

Scirpus **occidentalis** (Watson), n. comb.

Scirpus lacustris var. *occidentalis* Watson, Bot. Cal. **2**: 218 (1880).

Perennial: rootstock horizontal, scaly: culm erect 1.2–2 m. high, .5–2 cm. in diameter at base, attenuate upward, usually hard especially in eastern specimens, olive green, smooth, minutely striate, leafless, or basal sheaths produced into acuminate blades broader than found in *S. validus* and sometimes 20 cm. long; sheaths with hyaline border becoming fibrillose; lowest sheath usually somewhat indurated: inflorescence a compound, usually erect and congested umbel of few to many spikelets, subtended by a single erect, attenuate, terete or obscurely 3-sided bract, channeled only at the base (1–7 cm. long); rays 0–5 cm. (rarely over 3 cm.) long, rather stout, plano-convex, the margins scabrous; bractlets vaginate, pale, spotted with ruddy brown, scarious, lacerate-fimbriate, slightly viscid-pubescent especially toward the summit, abruptly mucronate; secondary rays when present 0.3–2 cm. long: spikelets in capitate clusters of 2–7 or solitary (the greater number capitate in every umbel), pale grayish brown to dark rusty brown, cylindrical or ellipsoidal, obtuse, 4–5 by 10–18 mm., densely fruited, the scales overlapping ½ their length or more: scales ¼–⅓ longer than the achenes, oblong-ovate, obtuse and emarginate, spotted with ruddy brown, viscid-pubescent along the midrib and on the upper third with stubby hairs, the hyaline margin lacerate, ciliate; the strong, pale midrib exserted into a prominent scabrous tip: style 2-cleft to near the base; bristles 6, slightly shorter than the achene, reddish brown, retrorsely barbed: achene dark grayish brown, obovoid, abruptly acuminate 1.7–1.9 by 2.5–3 mm., in section unequally biconvex, hexagonally reticulate under a lens.

Type locality: "California ranging from San Diego county to British Columbia and eastward to Texas and Colorado."

Scirpus lacustris var. *occidentalis* Watson seems to have no type specimen extant. Dr. Watson cites no definite specimens and there is no specimen of *S. occidentalis* from San Diego county in the Gray or National Herbaria of a date previous to the publication of var.

occidentalis. In the Gray Herbarium are the following marked "*S. lacustris*, var. *occidentalis*" in Dr. Watson's handwriting: NEVADA, mouth of Run [?] River, alt. 5000 ft., July 1868 — immature (*Watson* 1212, King Exped.): BRITISH COLUMBIA, Saturna Island, 1858 — immature (*Lyall*, Oregon Boundary Comm.): CALIFORNIA, Yosemite Valley, 1866 — nearly mature (*Bolander* 6231, Geol. Surv. Cal.); Santa Barbara, 1875 — very immature (*Rothrock* 57, Wheeler Exped.): NEW MEXICO, 1873 — immature (*Loew*, Wheeler Exped.); 1851–52,— immature (*Wright* 1940). In the National Herbarium is one specimen marked var. *occidentalis* by Dr. Watson: NEVADA, Humboldt Pass, alt. 6000 ft., Sept., 1868 — fully mature (*Watson* 1212).

The discrepancy in the data of these two specimens of *Watson 1212* is probably due to giving the same number to all collections of one species during the expedition.

Specimens examined. — Those cited above: NEWFOUNDLAND (*Waghorne* — very immature, but scales large and viscid): MAINE, Mattawamkeag Lake (*Fernald*); Ship Pond, Elliottsville (*Fernald* 419); Chemo Pond, Bradley (*Briggs*); Monhegan Island (*F. G. Smith*); Rangeley Lakes (*Furbish*): NEW HAMPSHIRE, Dixville Notch (*Boott*): MASSACHUSETTS, Revere (*Young*); Fresh Pond, Cambridge (*Boott*): NEW YORK, shore of Lake Ontario (*Wibbe*): ONTARIO, Sarnia (MACOUN 34,582): OHIO, Licking Co. (*Jones*): INDIANA, Lake Michigan basin (*Hill*, *Lansing* 962, *A. Chase* 345); ILLINOIS, South Chicago (*A. Chase* 1628): Romeo, Desplaines valley just beyond Lake Michigan watershed (*Umbach*): WISCONSIN, Lake Michigan basin (*R. Bebb*): MISSOURI, Courtney (*Bush* 23): NEBRASKA, Middle Loup River, Thomas Co. (*Rydberg* 1388 in part): MONTANA, Madison River (*Rydberg* 2277); Madison River (*Shear* 521); Snake River (*A. & E. Nelson* 6571): WYOMING, Little Missouri Buttes (*Griffiths* 593): COLORADO, Canon City (*Brandegee*): UTAH (*Bishop*): NEW MEXICO (*Vasey*): ARIZONA (*Rothrock* 330*a*); Santa Cruz (*Pringle*); (*Vasey*); vicinity of Flagstaff (*MacDougal* 275): BRITISH COLUMBIA (*Lyall*): WASHINGTON, Cascade Mts. (*Tweedy* 2); Falcon Valley (*Suksdorf* 85); Lake Chelan (*Gorman* 697); Okanogan Co. (*Elmer* 539); (*Vasey* 11): OREGON (*E. Hall* 562); Wasco Co. (*Leiberg* 865); CALIFORNIA, San Bernardino Valley (*Parish* 956); Walkers Basin (*Rothrock* 280); Tulare Co. (*Coville & Funston* 1736); Placer Co. (*Vasey*).

Scirpus occidentalis is distinguished from *S. validus* by achene ⅓ larger, by scales ¼–⅓ longer than the achene and nearly twice as long as scales of *S. validus*, viscid-pubescent, overlapping ½ their length or more; by the cylindric, more densely fruited spikelets in capitate clusters; and by the denser umbels and harder culms. From *S. lacustris* L. it is distinguished by the 2-cleft style, lenticular achene, viscid-pubescent scales, cylindric, densely fruited spikelets, and by the terete or obscurely 3-sided involucral bract.

This species shows much variation. Specimens from New England and the Great Lakes have smaller culms, spikelets darker in color, often longer; the scales more viscid (in many western specimens scales are but very slightly viscid), and umbels less congested than usual in western specimens, though the latter vary from dense, globular heads to open umbels with rays 5 cm. long. Plants having this open umbel can be determined by the achene and scale.

Scirpus **heterochaetus**, n. sp.

Culms erect, 1–2 mm. high, 4–10 mm. in diameter at base, terete, usually hard, light green, smooth, minutely striate, leafless, or basal sheaths produced into acuminate blades 2–15 cm. long and 3–5 mm. wide; the sheaths with hyaline borders lacerate and slightly fibrillose: inflorescence an open, suberect compound umbel of 9–17 spikelets, subtended by a single erect attenuate terete bract, channeled only at the base (3.5–7 cm. long); rays 1–6 cm. long, very slender, plano-convex, smooth or slightly scabrous on the margins; bractlets vaginate, pale brown to wine color, long acuminate, the hyaline margin lacerate-fimbriate, smooth except the scabrous excurrent tip of the midrib; secondary rays .5–1.5 cm.: spikelets solitary, ovoid-oblong, acute or subacute, 3–4 by 8–10 mm., reddish brown: scales $\frac{1}{3}$ longer than the achenes, ovate-oblong, subacute, deeply emarginate, thickly spotted with wine-color toward the summit, pale below, the hyaline margins erose, glabrous except the prominently excurrent scabrous, slender tip of the midrib: style 3-cleft to below the middle: bristles 2–4 (usually 2) slender, fragile, unequal, shorter than the achene (usually not over $\frac{1}{2}$ the length of the achene), dark red, retrorsely barbed or nearly smooth: achene fuscous 1.7–1.8 by 2.6–3 mm., obovate, abruptly mucronate, in section triangular, the ventral side plane or slightly concave, the dorsal angle rounded, hexagonally reticulate under a lens.

Type: "*Brewer & Chickering*, swamps, Havana, N. Y., June 26, 1858," specimen in the National Herbarium, no. 27,519.

This is the form referred to (fide note on above specimen) by Dr. Gray in Manual. Fifth Ed. p. 563: "A slender variety with narrower heads, very smooth scales and shorter or fragile bristles, was sparingly collected by Rev. J. W. Chickering at Havana, N. Y."

Other specimens examined: — Vermont, Milton, July 25, 1893 (*Grout*): New York, Havana (*Chickering* in Gray Herb.): Illinois, Athens, July, 1869 (*E. Hall* in Herb. Field Columbian Mus. no. 35,203); Minnesota, Fort Snelling, July 24, 1888,— a robust specimen with immature spikelets (*Mearns*); Minnesota or South Dakota [no locality given] July 24, 1839 (*Geyer*, Nicollet's Northwestern Exped.): Nebraska ("Ex Father *Wibbe*"): Oregon, Swan Lake, Klamath Co. July 14, 1895 (*Applegate* 759): Idaho, valley of Lake

Tesemini, Kootenai Co., specimen with slender culms 2 m. high, spikelets 23 in number, slightly larger than those of the other specimens, scales with scabrous midrib, otherwise glabrous; achenes very immature, bristles 2–4 very fragile as in the other specimens, doubtless a form of this species (*Sandberg* 687).

Scirpus heterochaetus is distinguished from *S. validus* and *S. occidentalis* by the 3-cleft style, by the triquetrous achene, by the fragile unequal bristles fewer and shorter, and by the glabrous scales. From *S. lacustris* L., to which it is closely allied, it is distinguished by the terete involucral bract, solitary spikelets, and fragile unequal bristles fewer and shorter. Apparently rare; the above specimens all lack rootstocks. It is worthy of note that four of the above specimens bear some note by the collector of variation from *S. lacustris* so called.

SCIRPUS CALIFORNICUS (C. A. Meyer) Britton, Ill. Fl. **1**: 267 (1896).

Elytrospermum Californicum C. A. Meyer, Mém. Acad. St. Pétersb. (V.) **1**: 201, pl. 2 (1831).

This remaining species of the *lacustris* group in this country has been recognized as distinct, and is so easily determined by its aristate scales and broad, dark red bristles plumose below, that it needs no delineation here.

The greater number of specimens examined were immature. In *Scirpus*, as in the other genera of *Cyperaceae* it is very important that plants be collected at maturity.

Thanks are due the Gray Herbarium, National Herbarium, and herbaria of the New England Botanical Club and of the Field Columbian Museum, for the loan of specimens, and to Prof. C. V. Piper for helpful criticism.

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EXPLANATION OF PLATES 52 AND 53.

a. *Scirpus validus* Vahl (*A. Chase* 1136, Chicago).
b. *Scirpus lacustris* L. (*Reinsch*, Erlangen).
c. *Scirpus occidentalis* (Watson) Chase (c. *A. Chase* 1628, South Chicago, illustrating Lake Michigan and New England form; cc. *Leiberg* 865, Oregon, illustrating the western form).
d. *Scirpus heterochaetus* Chase (*Brewer & Chickering*, Havana, N. Y. type specimen).

Corresponding parts drawn on the same scale; inflorescence natural size; spikelet × 5 diam., achene with cross section, and scale × 10 diam.

BRYOPHYTES OF THE MT. GREYLOCK REGION, — III.

A. Le Roy Andrews.

The mountain surface still yields returns for further effort expended, more slowly it is true, but each newly found species is of proportionately enhanced interest. The species listed below were collected on several trips made during the past spring and summer. Special attention paid to the closely related genera, Bryum and Webera, brought to light several good species, otherwise results are more or less "scattering."

Ragged Mountain is a spur of the mountain mass, of irregular contour and altitude, running in a generally northerly or slightly northeasterly direction, from the Bellows Pipe to North Adams, forming the eastern wall of the Notch. The eastern slopes of the mountain in Adams, as well as those of Ragged Mountain, show several species of more or less southern tendency. The Notch is perhaps in even greater degree than the Hopper, the abode of surprises, generally, though not always, of northern species, the isolated character of its moss and hepatic flora corresponding with our knowledge of New England mountain flora generally and offering a hint to collectors upon other mountains.

I again add brief notes as to altitude, distribution, etc. The species not previously reported are the following:

Musci.

Amblystegium varium (Hedw.) Lindb. Decayed spot on tree at middle altitude. This is of the typical form, which, as occurring here and in the vicinity, generally is very distinct from the one variously treated as variety or species, *orthocladon*, which Prof. Cheney, however, considers unworthy of distinct treatment.

Anacamptodon splachnoides (Froelich) Brid. A specimen with a single capsule mixed with the last. Also on a decayed spot in beech-tree at higher altitude, full-fruited. This species, though not frequently met with, proves to be of general distribution in the vicinity.

Brachythecium laetum (Brid.) Br. & Sch. On wet bank in Notch, lower altitude.

Brachythecium plumosum (Sw.) Br. & Sch. Wet places at base of mountain in Notch.

Brachythecium rivulare Br. & Sch. In compact, round, yellowish cushions of more or less erect stems, near small brook at middle altitude.

Bryum capillare L. Not uncommon on ground and rocks of lower altitudes, but rarely fruiting. Found fruiting only on large rock at base in Adams. This seems to be a species of very general occurrence, but often unnoticed from its sterile condition. I have, among others, specimens from Pownal, Vermont.

Bryum intermedium Brid. Crevices of a small rock in clearing, middle altitude.

Bryum pseudotriquetrum Schwaegr. Occasional at middle or lower altitude, about springs or small brooks. *Philonotis fontana* is regularly a companion plant. The species is an attractive one, its long, frequently purple-shining seta sometimes showing a tendency to become broadly geniculate at the base.

Dicranum montanum Hedw. On bark of a dead tree near the summit. Not fruiting.

Dicranum undulatum Turn. On comparatively dry ground on east slope of Ragged Mt., North Adams. Very full-fruited.

Dicranum viride Schimp. On decayed spot in a beech-tree, not far below summit. Sterile.

Eurhyncium Boscii (Schwaegr.) Jaeg. A rather small, fruiting form on ground near road at base in Adams.

Eurhyncium graminicolor (Brid.) Paris. (*Hypnum Sullivantii* of Manual.) On rocks, middle altitude in Hopper.

Hylocomium brevirostrum (Ehrh.) Br. & Sch. Wet sloping ground or rocks in woods, middle and higher altitude. Not fruiting.

Hypnum cuspidatum L. Swampy place at base of mountain in Adams. Sterile.

Myurella Careyana Sulliv. Small specimen from large rock in woods, middle altitude.

Pogonatum brevicaule Beauv. Not uncommon on bare ground beside roads, at and near base of mountain in Adams and North Adams.

Pylaisia velutina Br. & Sch. Bark of trees in dense woods, middle altitude.

Rhyncostegium serrulatum (Hedw.) Jaeg. In considerable quan-

tity and well fruited, on ground, lower slopes of Ragged Mt., in North Adams. Fruit just reaching good maturity in early September.

Thuidium paludosum (Sulliv.) Rau & Hervey. Swampy place at base in Adams. Sterile.

Webera annotina (Hedw.) Schwaegr. This species was detected by Mrs. E. G. Britton, who kindly called my attention to the difference between its gemmae and the corresponding bodies in the case of *W. proligera.* It is a species of very uncommon occurrence and was growing on the bare ground of a moist bank in the Notch. No fruit was seen.

Webera cruda (L.) Schwaegr. This species was growing in a similar locality, not far from the last, and was also identified by Mrs. Britton. The plants were fruiting abundantly.

Webera proligera (Lindb.) Kindb. Moist banks by roads near summit, also toward base at Adams and in Notch. From the last locality I have a single small tuft showing this species and *W. annotina* intimately mixed together. The specimens occurring near the summit display regularly much longer, flexuous stems, with distant, darker green leaves, giving superficially a very different aspect from those of lower altitude, which latter, except for the difference of the propagula, closely simulate *W. annotina.* The present species has been considered uncommon in America, but may readily have been overlooked. In this connection I might mention finding specimens in a similar locality in the mountain town of Florida (Mass.), which bore abundant fruit, the capsules just reaching maturity when collected (June 28, 1903).

Hepaticae.

Anthoceros laevis L. Small specimen from wet bank in Notch, with *Blasia pusilla.*

Bazzania triangularis (Schleich.) Lindb. (*B. deflexa* of Manual.) Perpendicular surface of a large rock in woods, middle altitude. Dr. A. W. Evans kindly identified this specimen.

Frullania Brittoniae Evans. (*F. dilatata* of Manual.) On bark of tree in Notch. Also on rock at Bellows Pipe.

Geocalyx graveolens (Schrad.) Nees. On ground, middle and lower altitudes. Occasionally fruiting.

Kantia Trichomanis (L.) S. F. Gray. On ground at various points,

lower altitude. Not fruiting; occasionally showing pseudopodia and gemmae.

Moerckia Flotowiana (Nees) Schiffn. This species occurs sparingly on a wet bank in the Notch. It is new to New England, and I take the liberty of quoting from information kindly furnished me by Dr. Evans as to its relationships and American occurrence. "*Moerckia Flotowiana* (Nees) Schiffn. is a plant which Nees von Esenbeck originally referred to *Pallavicinia Lyellii* as a variety, and which has until very recently been considered a variety of *Moerckia* (or *Pallavicinia*) *Hibernica*. Schiffner maintains in a recent paper that the plant is specifically distinct from *M. Hibernica*. Nees von Esenbeck, in 1838, reported the species from Newfoundland, but it has not since been recorded from eastern America. It occurs in the Harriman collections from Alaska."

Nardia crenulata (Smith) Lindb. On bare ground at base in Cheshire, also in Notch.

Pellia epiphylla (L.) Corda. Wet ground in various places and at all altitudes. Not conspicuous except when fruiting, in April.

Plagiochila asplenioides (L.) Dumort. At lower and middle altitudes, especially about beds of small mountain brooks. Leaves entire or denticulate.

University of West Virginia, Morgantown.

A NEW HYBRID FERN FROM VERMONT.

Margaret Slosson.

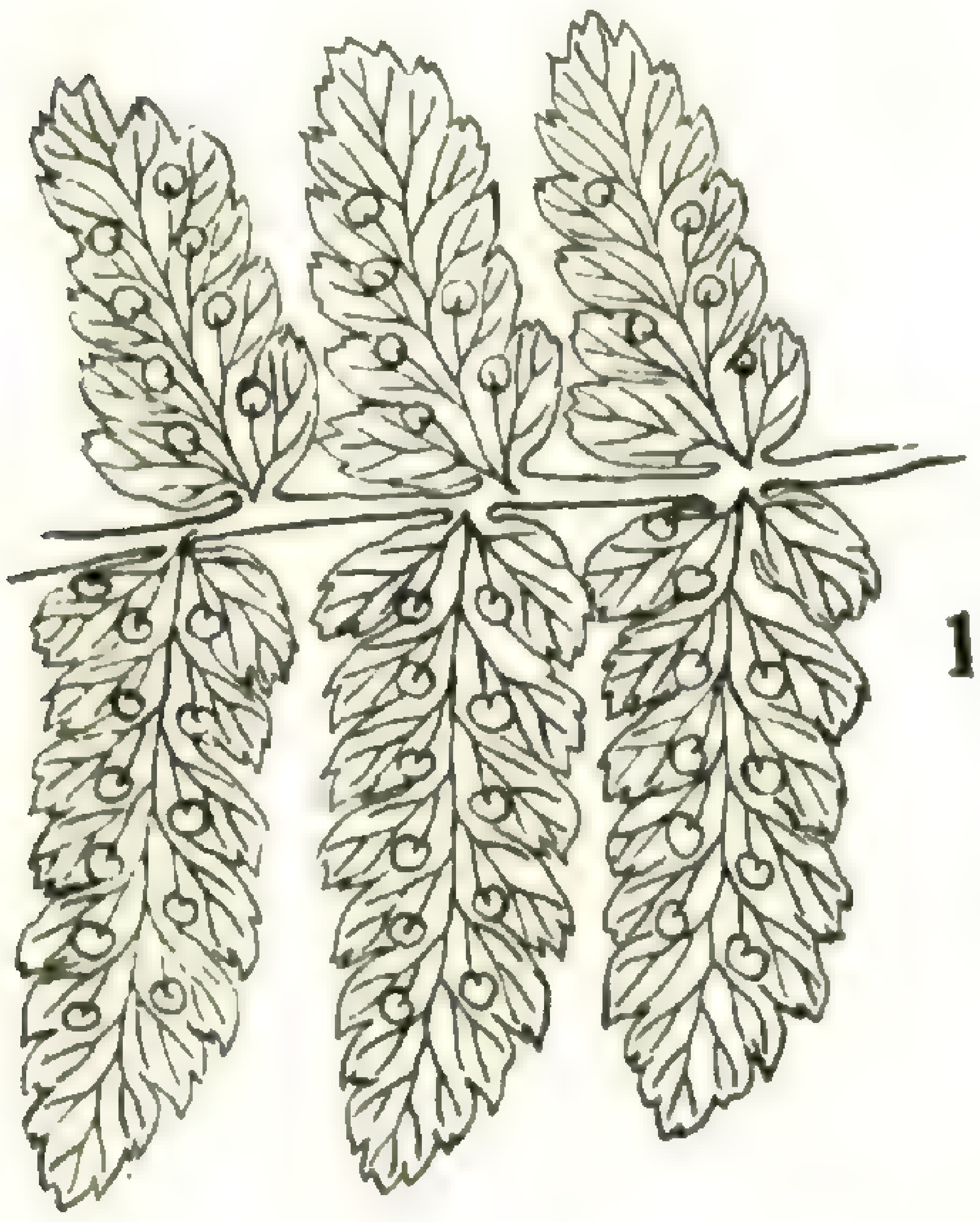
Dryopteris Pittsfordensis, hyb. nov. — Mature sporophyte large, 1½–2, or more feet tall, resembling that of *D. spinulosa dilatata*, the young fronds like those of *D. marginalis* with the lowermost pair of pinnae enlarged, partially evergreen, the sporophylls withering in late autumn.

Rootstock decumbent, as in *D. spinulosa*, between which and *D. marginalis* the plant is a probable hybrid. Fronds fasciculate, crosiers densely clothed with pale brown scales; stipes 6–12 inches long, usually about one-third the length of the frond, stramineous, browning with age, especially below, deeply furrowed along the face, and clothed with a mixture of broad, narrowly ovate, and linear-lanceolate acuminate entire or lacerated brown scales, darkest below and often with blackish brown centres, paler and transparent above,

becoming chaffy along the strongly grooved and winged rachises; fibro-vascular bundles 3–5 or 7. Laminae 10–20 or more inches long, 6–10 inches broad, oblong or ovate lanceolate, or triangular-ovate with long acuminate apices, broadest just below the middle, bipinnate or, in the largest forms, tripinnate, at least below; pinnae mostly ovate or oblong lanceolate, long-acuminate, the lowermost pair much the broadest and irregularly deltoid, the superior pinnules much the longest, lobes irregularly spinulose or sharply toothed; texture subcoriaceous, softly downy in the young fronds, and wrinkled on the face from the deep furrows of the midribs and veins; sori elevated, submarginal, reniform, indusia coriaceous; veins pinnately branched and forked.

Syn. *Nephrodium Pittsfordense* Davenport, in litt.

The special characters of this plant lie in the long-acuminated outline of the fronds and pinnae, the submarginal elevated sori and coriaceous indusia, and the occasional presence on the older stipes of large deeply lobed or lacerated appressed scales with a broad dark base and the exterior lobe greatly elongated. The scales of the stipes are for the most part attached at the base by a well rounded sinus with either entire or ciliated margins; the smaller ones much like those on some of the Polypodiums, as for example, *P. polypodioides*.


1

In the subcoriaceous texture, and to some extent in the coloring, of the fronds, and in the conspicuous submarginal elevated sori appearing almost cork-like in age, the plant resembles *D. marginalis*. The toothed margins of the fronds, on the other hand, suggest *D. spinulosa*. Both at first sight and on close examination the hybrid character of the plant appears unquestionable.

3

2

I first found this plant in 1895, growing among stones by a roadside in Pittsford, Rutland County, Vermont. The specimens formed a large clump. Nearby grew *D. marginalis* and a form of *D. spinulosa*. In 1901 the hybrid clump was transplanted to Mr. George E. Davenport's garden in Medford, Massachusetts, where it has remained since. It has produced mostly smaller fronds in the new location than in the old, but apparently has lost none of its peculiar characteristics at any time.

Type specimens are in the herbarium of the New York Botanical Garden.

I am greatly indebted to Mr. Davenport for his kind assistance in the study of this fern.

NOTE BY MR. DAVENPORT.— Since Miss Slosson's fern was transplanted to my garden in 1901 it has increased to five plants from young crowns growing out from the main rootstalk. One of the new plants was sent to Miss Slosson and another has been reserved for the Botanical Garden at Cambridge. During the past two seasons I have pressed all available fronds from the original plant and specimens of these will be deposited in the Gray Herbarium, the Herbarium of the New England Botanical Club, and the Davenport Herbarium of the Massachusetts Horticultural Society. In 1893 Mr. Raynal Dodge collected some specimens which he regarded as of hybrid origin between *Nephrodium spinulosum* and *N. marginale*. These I have had under examination for some time, but in the absence of the rootstalk, and other necessary data, I have not been able to satisfy myself as to their exact status. They differ greatly, however, from Miss Slosson's fern.— G. E. D.

EXPLANATION OF FIGURES:— Fig. 1, portion of a pinna of *Dryopteris Pittsfordensis*, × 1½. Fig. 2, part of a pinna of *D. spinulosa intermedia*, × 1½. Fig. 3, part of a pinna of *D. marginalis*, × 1½.

THE RANGE OF SAURURUS CERNUUS EXTENDED INTO RHODE ISLAND.— In August, 1902, while exploring the meadowlands stretching from Adamsville, Rhode Island, to the ocean shore, Judge Benjamin Cook, Jr., ran across some plants, which were at once recognized as *Saururus cernuus*, L. One year later, July 29, 1903, Mr. Cook and the writer visited the locality and found the plants at

the height of their flowering period. As *Saururus cernuus* does not appear to be recorded from Rhode Island, the discovery was considered worthy of note, and fresh specimens were sent to the Gray Herbarium and the Herbarium of Brown University. The locality in which these plants were found is about two and one-half miles southwest of Adamsville, Rhode Island. The plants seem to be well established, for a small stream running through an open meadow was literally choked with Saururus for more than fifty yards of its course. A more extended exploration of that neighborhood failed to reveal another spot where the plants grew. The new station is interesting from the fact that it brings *Saururus cernuus* well across Rhode Island, and very nearly into Massachusetts.— S. N. F. Sanford, Fall River, Massachusetts.

Some Introduced Plants of Connecticut.— A group of plants introduced in Connecticut, probably with grain, has already been noted (Rhodora III: 60), and those growing in another place near by seem worthy of a little space. This field was sowed in the spring of 1902 with oats bought at a feed-store and also with a mixture of timothy and clover seed. The first year I found growing among the oats, sparingly, *Camelina sativa*, Crantz. besides a number of other more common weeds of grain fields, such as *Brassica* spp., *Spergula arvensis*, L., *Agrostemma Githago*, L., *Linum usitatissimum*, L., and *Bromus secalinus*, L. In 1903 an abundance of *Viola arvensis*, Murr., in May was followed in July by a quantity of *Cuscuta Epithymum*, Murr., in one patch, with occasional plants of *Matricaria inodora*, L., and perhaps seven or eight individuals of *Anthemis tinctoria*, L. The list is finished with *Crepis virens*, L., which was found scattered over the field on Sept. 3. Of the above species *Camelina sativa*, L., and *Matricaria inodora*, L. are not previously reported from the state so far as I know, while *Crepis virens*, L. does not appear in any list at hand although credited to the state in Britton's Manual. The *Camelina* can hardly claim a permanent place in our flora, as it seems to have already vanished; the *Matricaria* will be looked for with interest in 1904; but the *Crepis* has every appearance of being well established.— E. B. Harger, Oxford, Connecticut.

Bulblets of Microstylis ophioglossoides.— Upon July 30th, 1903, it was my good fortune to find an unusually fine specimen of *Microstylis ophioglossoides*, the stem measuring eleven inches from top of bulb to tip of raceme. While I was preparing it for the press my attention was attracted to several bulblets which had formed underneath the loose outer coat of the bulb very much as the bulblets form upon Vallota bulbs. They were pearly white and closely resembled small kernels of rice. There was no regularity in their position upon the mature bulb. One of the bulblets had already sent up a tiny leaf upon a stem half an inch in length and plainly exhibited the same double structure and the same general form as mature bulbs. *Microstylis ophioglossoides* is not uncommon in this locality but it seems to be a shy seeder, as I seldom find more than one or two capsules formed from a raceme of blossoms. Therefore it would seem as if Nature provided for its propagation in another method than by seed. — Harriet A. Nye, Fairfield Center, Maine.

Cleome serrulata in Maine.— On August 3rd, 1903, a party of ladies were waiting for the train at Moosehead Inn Station on the line of the Canadian Pacific Railroad. Being interested in botany they improved the opportunity by seeking for novel flowers, and just as the train was coming into the station one of their number, Miss Harriet Burr, found a small plant about five inches in height growing in the very middle of the railroad track. This was submitted to the writer and by him determined as *Cleome serrulata*, Pursh. The specimen was sent to Mr. M. L. Fernald of the Gray Herbarium who verified the identification and reported that it was new to the State.— O. W. Knight, Bangor, Maine.

Helenium nudiflorum in Groton, Connecticut.— On July 29th, 1903, while walking through the mowing lot at Esker Point, near Noauk, I came across a plant in bud which looked like a Rudbeckia, but left it to develop. On my next trip a few days afterwards I found it unfolded, and it proved to be *Helenium nudiflorum* Nutt. This time I found four or five other plants of the same species a few yards away. As the grass was mowed soon after, I saw no more

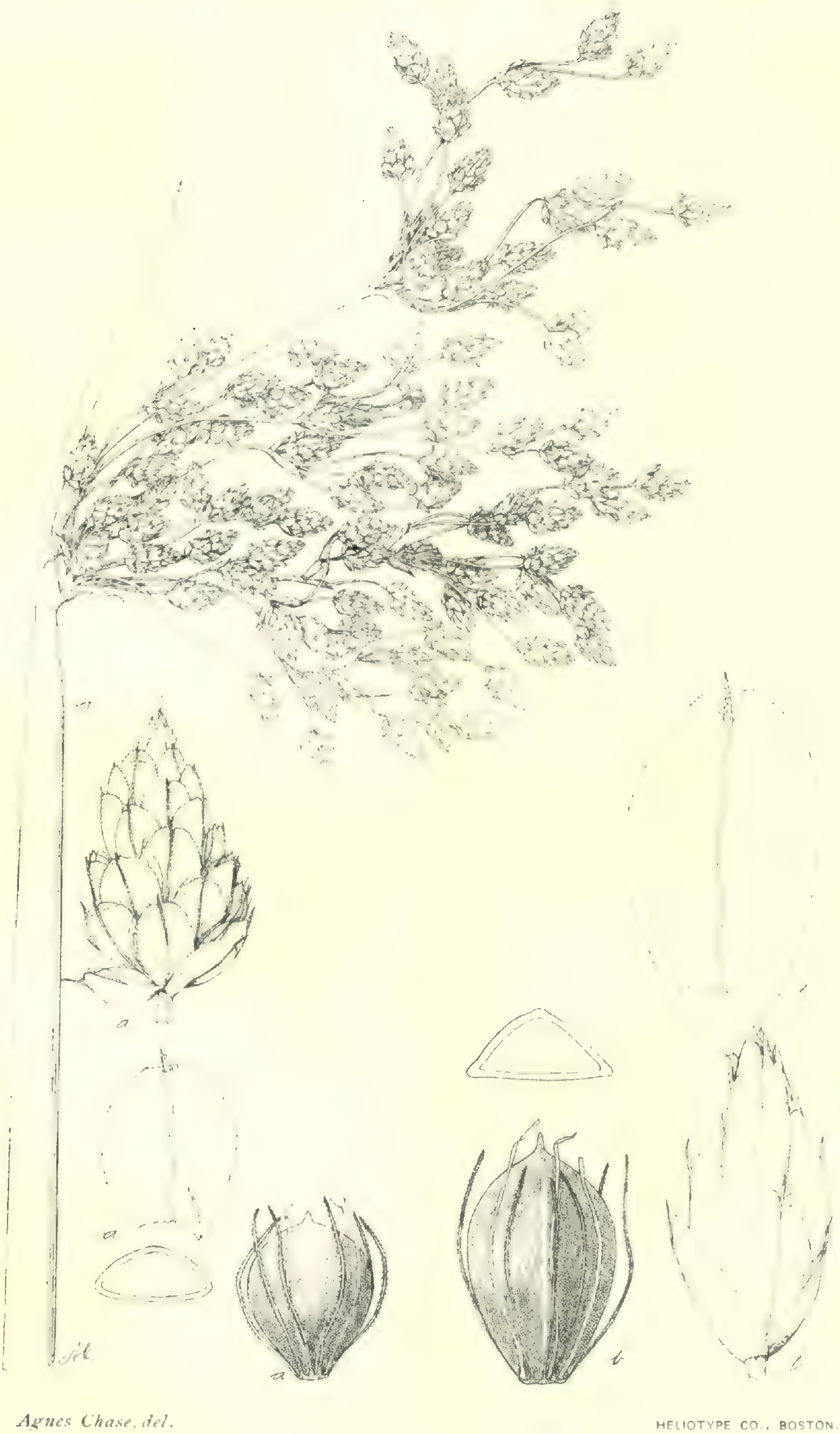
of it, but shall hope to greet it again another year. Gray's Manual gives the range of this species as from Illinois and Missouri to North Carolina and Texas. It has, however, been known for some time near Providence, Rhode Island (see W. W. Bailey, Rhodora, iv. 198), and I learn from the Gray Herbarium that Mr. J. C. Parlin has found it spreading from wool-waste at North Berwick, Maine.

It seems probable that it may have been introduced at the Connecticut station in grass seed.— Frances M. Graves, New London, Connecticut.

Further Stations for Botrichium matricariaefolium in Connecticut.— Bishop's list gives only two stations for *Botrychium matricariaefolium*, one in Sherman (Fairfield County), the other in Franklin (New London County). In Rhodora, 3: 36 (1901) Mr. A. W. Driggs notes the finding of *B. matricariaefolium* in West Hartford (Hartford County). In June, 1901, the writer collected several specimens at Mansfield (Tolland County). During the summer of 1902 at Cornwall Bridge (Litchfield County) many specimens were found; and at Kent Falls, North Kent, in the same county one plant was collected. Last summer (1903) this species was found to be abundant on the mountain slopes in Salisbury (Litchfield County). Specimens from these stations are preserved in the writer's herbarium.

As this plant has been found in five of the eight counties and in widely separated parts of the state, it is probable that it has been overlooked and will be found to be generally distributed throughout. — A. Vincent Osmun, Amherst, Massachusetts.

Vol. 6. no. 63, including pages 45 to 64, was issued 7 March, 1904.



Agnes Chase, del. HELIOTYPE CO., BOSTON.

Fig. a, Scirpus validus: fig. b, S. lacustris.

Agnes Chase, del. HELIOTYPE CO., BOSTON.

Fig. c, Scirpus occidentalis: fig. d, S. heterochaetus.

Rhodora

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SOME CASUAL ELEMENTS IN THE FLORA OF WESTERN MAINE.

J. C. Parlin.

Any lover of plants, one who is looking for species new to his experience, should, if resident near a woolen mill, carefully watch the waste-heap for species native in those regions forming the source of the wool supply.

For thirteen years, I have had the pleasure of studying the flora of the waste-heap of the North Berwick Manufacturing Company's plant, during which time the factory has used wool from Arizona, California, New Mexico, Texas, Colorado, Utah, Idaho, Oregon, the Middle West, and, in 1892, a few pounds from Australia.

Not many of the "sheep ticks" have adapted themselves to our soil and climate. Perhaps the treatment and use of the wool-waste will somewhat explain this. The waste is heaped into a natural hollow, the outlet of which is closed; for several years, it there collects moisture, is mixed with night-soil, rots, and is finally carted away to form a compost heap before being used for a fertilizer. *Atriplex patulum*, L., var. *littorale*, Gray, *Medicago lupulina*, L., and *Erodium moschatum*, Willd., are the only species seeming to have been introduced in the wool that are at all permanently located here. The first is abundant in waste ground around the storehouses of the factory; the medick is well established in the surrounding grass-land; while the heron's-bill is occasionally found around the buildings and along the river-bank below the mill. *Madia glomerata*, Hook., *Hymenatherum aureum*, Gray, *Erodium circutarium*, L'Hér., and *Helenium nudiflorum*, Nutt., have occurred along the river, the last species remaining several years in grassland, but have

shown no signs of becoming permanent. The Helenium has not been found near the waste-heap, and may have been introduced in grass seed; but I have inclined to the wool theory, because the plants were all found along the line of the principal current when the river is high enough to overflow the intervales below the mill.

Taken as a whole, the list does not present many plants of a character, in this latitude, to worry the farmer with the fear of new weeds.

For the identification of the majority of the species, I am indebted to Merritt L. Fernald. Thanks are also due Dr. B. L. Robinson, Dr. J. M. Greenman and Prof. F. Lamson Scribner, for their kind assistance in the work of identification.

Plants introduced in wool-waste at North Berwick, Me.

Senebiera pinnatifida, DC.
Erodium cicutarium, L'Hér.
E. moschatum, Willd.
E. Botrys, Bertolini.
Medicago lupulina, L.
M. arabica, All. (*M. maculata*, Willd.).
M. hispida, Gaertn. (*M. denticulata*, Willd.).
M. laciniata, All.
Glycyrrhiza lepidota, Nutt.
Aplopappus gracilis, Gray.
Artemisia annua, L.
A. Ludoviciana, Nutt.
Aster frondosus, Torr. & Gray.
Bidens aristosa, Britton (*Coreopsis*, Michx.).
Cosmos parviflorus, HBK.
Cotula australis, Hook. f.
Dysodia chrysanthemoides, Lag.
Helenium nudiflorum, Nutt.
Heterospermum pinnatum, Cav.
Hymenatherum aureum, Gray.
Madia glomerata, Hook.
Verbesina encelioides, B. & H.
Xanthium Canadense, Mill.
X. spinosum, L.
X. strumarium, L.
Echinospermum Lappula, Lehm.
E. Redowskii, Lehm., var. *occidentale*, Wats.
Veronica peregrina, L.
Marrubium vulgare, L.
Amaranthus retroflexus, L.
A. hybridus, L.
A. graecizans, L. (*A. albus*, L.).
Atriplex patulum, L., var. *littorale*, Gray.
Atriplex patulum, L., var. *hastatum*, Gray.
Chenopodium leptophyllum, Nutt.
C. olidum, Watson.
C. album, L., var. *viride*, Moq.
Monolepis chenopodioides, Moq.
M. trifida, Schrad.
Cenchrus tribuloides, L.
Tragus racemosus, Hall.
Sporobolus interruptus, Vasey.
S. cryptandrus, Gray.
S. cryptandrus, Gray, var. *strictus*, Scribn.
Polypogon Monspeliensis, Desf.
Deschampsia elongata, Munro.
Chloris cucullata, Bisch.
C. elegans, HBK.
Lycurus phleoides, HBK.
Bouteloua Humboldtiana, Griseb.
B. prostrata, Lag.
B. oligostachya, Torr.
B. uniflora, Vasey.
Eragrostis major, Host.
E. Neo-mexicanus, Vasey.

Poa tenuifolia, Buckl.
Puccinellia airoides, Nutt.
Festuca Myurus, L.
F. tenella, Willd.
Bromus marginatus, Nees (*B. breviaristatus*, Auct.).
B. carinatus, H. & A.
B. secalinus, L.
B. mollis, L.
B. racemosus, L.
B. racemosus, L., var. *commutatus*, Hook. f.
B. tectorum, L.
Hordeum jubatum, L.
H. pratense, Huds.
Elymus Sitanion, Schultes.

Many other species have grown on the waste-heap, but have not attained sufficient maturity to afford me any help to their identification; probably an expert could have recognized many of them.

Another species that has evidently come to stay is *Chenopodium foetidum*, Schrad. Its introduction may have been through the medium of the wool-waste, or in grass-seed. In the fall of 1900, the intervale where it has occurred was "broken up" and seeded; during the winter and spring of 1901, several heavy rains caused the river to overflow the peninsula formed by the lower end of the intervale, the top soil of which was scraped away by the ice, which was driven across it, instead of being carried around in the channel of the river. Hardly anything besides *Barbarea vulgaris*, R. Br., and *Asclepias Cornuti*, Dec., appeared that season, the ground lying fallow throughout the year. In the spring of 1902, the field was plowed, remanured (by which means the seed may have been brought in, the dressing coming partly from a stable where baled hay had been fed) and planted to potatoes and corn. In August and September of this year, I found a considerable quantity of the Chenopodium among the potatoes, but none among the corn. In 1903, the field was planted to the same crops, and the weed was abundant in all parts of the field. I would suggest that some appreciative botanist change the specific name from *foetidum* to *fragrans*, as I consider the odor pleasing.

Newly seeded fields, especially those seeded without grain in the fall, have always been among my favorite hunting grounds. In one, about ten years ago, I found *Berteroa incana*, DC., *Camelina microcarpa*, Andrz., *Sisymbrium altissimum*, L., *Thlaspi arvense*, L., *Viola arvensis*, Murr., *Silene Cucubalus*, Wibel., *S. noctiflora*, L., *S. dichotoma*, Ehrh., *Stellaria graminea*, L., *Medicago sativa*, L., *Melilotus alba*, Desr., *M. officinalis*, Lam. *Heliopsis scabra*, Dunal., *Echium vulgare*, L., *Narcissus poeticus*, L., and *Ornithogalum umbellatum*, L., the last two being, of course, garden escapes. The greater number of these have fallen asleep, but Heliopsis, Narcissus and Ornithogalum remain unto this day.

In 1902, another field of fall-seeding gave me the following species: — *Ranunculus micranthus*, Nutt., *Arabis perfoliata*, Lam., *Barbarea stricta*, Andrz., *Brassica juncea*, Cosson, *Camelina microcarpa*, Andrz., *Cardamine parviflora*, L., *Erysimum cheiranthoides*, L., *Sisymbrium canescens*, Nutt., *S. Sophia*, L., *Arenaria serpyllifolia*, L., *Saponaria Vaccaria*, L., *Silene antirrhina*, L., a form somewhat pubescent and with flowers fully open after sunset! *Erodium cicutarium*, L'Hér., *E. moschatum*, Willd., *Lotus arabicus*, L. ?, *Artemisia Ludoviciana*, Nutt., *Specularia perfoliata*, A. DC., *Gilia linearis*, Gray, *Echinospermum Redowskii*, Lehm., var. *occidentale*, Watson, *Myosotis verna*, Nutt., *Veronica arvensis*, L., *V. peregrina*, L., *Marrubium vulgare*, L., *Plantago Purshii*, R. & S. (*P. gnaphaloides*, Nutt.), *Apera Spica-venti*, Beauv., *Bromus marginatus*, Nees. As this field is on an intervale below the woolen factory and is overflowed every year, some of the above list were probably deposited there in waste that was washed down in a period of high water.

Eleven years ago, a pickle factory in this village was demolished and the brine in the vats was turned upon the ground, thereby saturating the soil with salt. In 1898 there sprang up a dense carpet of *Spergularia salina*, J. & C. Presl., with a border of a bushy form of *Polygonum aviculare*, L., and a colony of three plants of *Heliotropium Curassavicum*, L.!

While teaching at Rumford Center, Me., fifteen years ago, I was greatly interested in the circumstances attending the appearance and disappearance of *Euphorbia glyptosperma*, Engel. At that time there was a steam saw-mill on the outskirts of the village, and the method of moving logs from the yard to the slip was by hitching a chain around one end of a log and "snaking" it, as they aptly called the performance, to its destination. This kind of work tore up the sod, making furrow-like places all over the yard. During the summer, in these furrows, grew a profusion of the Euphorbia; the next year none could be found. Whence came it? Whither did it go?

North Berwick, Maine.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,— XV.[1]

ARTHUR STANLEY PEASE.

[The sign + indicates that an herbarium specimen has been seen; the sign – that a reliable printed record has been found.]

SAURURACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Saururus cernuus, L.					+	+

LORANTHACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Arceuthobium pusillum, Peck.	+	+	+	+		+

LAURACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Lindera Benzoin, Blume.	+	+	+	+	+	+
Sassafras officinale, Nees.	+	+	+	+	+	+

EUPHORBIACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Acalypha gracilens, Gray		+		+	+	+
" virginica, L.	+	+	+	+	+	+
Euphorbia corollata, L.	+		+	+		+
" Cyparissias, L.	+	+	+	+	+	+
" Esula, L.	+	+		+		+
" glyptosperma, Engelm.	+					
" Helioscopia, L.	+	+	+	+		
" hirsuta, Wiegand.	+	+	+	+	+	+
" Ipecacuanhae, L.						+
" maculata, L.	+	+	+	+	+	+

[1] Printed in RHODORA as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Euphorbia Peplus, L.	+	+	+	+	+	
" platyphylla, L.			+			
" polygonifolia, L.	+	+		+	+	+
" Preslii, Guss.			+	+	+	+
Mercurialis annua, L.	+			+		
Ricinus communis, L.				+		

Thymelaeaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Daphne Mezereum, L.			+	+	+	
Dirca palustris, L.	+	+	+	+	—	+

Elaeagnaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Shepherdia canadensis, Nutt.	+		+			

Notes on the above List.

Saururus cernuus, L. was found on July 29, 1903, by B. Cook, Jr. and S. N. F. Sanford at Adamsville, Rhode Island, but a few miles from the Massachusetts line (see Rhodora, vi. 77). It should be looked for, therefore, in the latter State.

That *Arceuthobium pusillum*, Peck has as yet not been reported from Rhode Island is doubtless due to the scarcity in that State of one of its commonest hosts, *Picea nigra*, Link. A careful search, however, of the trees recorded in Rhodora VI, 41–42 will perhaps reveal this interesting parasite which is probably well distributed through much of New England.

Croton capitatus, Michx. is represented by a sheet in the herbarium of the New England Botanical Club collected in South Boston, Massachusetts, in 1879. The name of the collector is not given.

Croton texensis, Muell. was found by Dr. C. W. Swan on a dump in the Back Bay, Boston, in 1890. This and the preceding species seem too fugitive to be included in the list above.

Euphorbia glyptosperma, Engelm. is to be expected from Con-

necticut, for it has been found on Fisher's Island, New York, only four or five miles from the Connecticut shore. Dr. J. K. Small informs me that the citation of this plant from Connecticut in Britton's Manual, p. 592, has reference to specimens from the Fisher's Island station.

Euphorbia Ipecacuanhae, L. In the John A. Lowell Herbarium at the Boston Society of Natural History there is an undated specimen of this plant collected at Enfield, Connecticut, by Dr. M. M. Reed. A letter discovered by Mr. C. H. Bissell and kindly communicated by him to me has shown that Dr. Reed was a friend of Dr. J. W. Robbins of Uxbridge, Massachusetts. An undated specimen of this plant, collected in Enfield, by Robbins, is in the herbarium of Mr. J. N. Bishop at Plainville, Connecticut, but no specimen of it has as yet come to light in the herbarium of Robbins, part of which is at Mt. Holyoke College and part at South Natick, Massachusetts. It is probable that the specimens gathered by Dr. Reed and Dr. Robbins date from between 1824 and 1830.

Euphorbia platyphylla, L., collected on a dump at Cambridge, Massachusetts, by Mr. Walter Deane on October 10, 1885, has not reappeared and can hardly be included in the list above.

Euphorbia Preslii, Guss. The report of this species by Professor Jesup in his list of plants near Dartmouth College, New Hampshire, was probably based on the plant which is now known as *E. hirsuta*, Wiegand. Professor Lyman of Dartmouth College writes me that the only specimen of true *Euphorbia Preslii* in Professor Jesup's herbarium comes from Massachusetts.

Two western species of Euphorbia which are not sufficiently permanent to be included in the list above should be put on record here. *Euphorbia prostrata*, Ait., gathered on cotton-waste at Malden, Massachusetts, Sept. 20, 1890, by Mr. F. S. Collins, is now in the herbarium of the New England Botanical Club. A small scrap of *E. serpens*, HBK. is in the herbarium of Brown University. It was gathered at Gilmanton, New Hampshire, August, 1871, by Rev. Joseph Blake.

Mercurialis annua, L. has been gathered on wharves in Bangor, Maine, in 1903, by Mr. O. W. Knight, and at East Somerville, Massachusetts, in the same year, by Mr. A. H. Moore and the writer. It has been known in New England, however, for a much longer time, since of two sheets of it in the herbarium of the Boston

Society of Natural History, collected in Boston, at least one (and probably both), cannot have been gathered later than 1868.

Ricinus communis, L. I have with some hesitation included in my list. It has been collected in two successive years, however, at Dedham, Massachusetts, by Mr. E. F. Williams.

A plant labelled "*Shepherdia argentea*, Roxbury, Massachusetts, 1849, [J. A.] Lowell," in the Boston Society of Natural History herbarium cannot represent a native of our range.

Shepherdia canadensis, Nutt. may perhaps be sought in Coös County, New Hampshire, since it is found in Madison, Maine, and in Vermont. The Vermont stations, however, are in the western part of the State.

Andover, Massachusetts.

The Occurrence of Verbena stricta and Helianthus mollis in Massachusetts.— On Aug. 2d, 1903, Dr. B. J. Handy and the writer were botanizing in some fields on the outskirts of Fall River. At the edge of an excavation in a bank of glacial till a plant was seen which had the characteristic appearance of Verbena, but the larger blue flowers and the coarseness of the plant showed at a glance that it was not *Verbena hastata*, L. common in this region. Upon analysis it proved to be *Verbena stricta*, Vent. About a dozen plants were observed growing among the stones and coarse soil in the pit.

As we continued our walk in an adjoining field another group of unfamiliar plants, in full flower, attracted our attention. This colony was more extensive, there being some fifty plants, which proved to be *Helianthus mollis*, Lam. As no station in New England is mentioned in any of the standard manuals of botany, both plants being native of the West and South, inquiry was made at the Gray Herbarium, and a search of the available literature brought to light but two New England records of *Verbena stricta*, namely from Bridgeport and Manchester, Connecticut (recorded in Bishop's Catalogue of Connecticut Plants), while *Helianthus mollis* does not appear to be recorded in New England at all.

The fields in which these plants were found are very close to a large cotton mill, and it is probable that the seeds of both species were brought North in the raw cotton and thrown into the fields with

the waste material from the mill. In the case of *Helianthus mollis*, it is probable, judging from the less bunched position of the plants, that the cotton waste containing the seeds was spread on the field as a fertilizer, a not uncommon practice. — S. N. F. Sanford, Fall River, Massachusetts.

Note on the Polygamy of Chionanthus.— In the article of Mr. Rehder in Rhodora (6 : 18, 1904), concerning the polygamy of the flowers of *Chionanthus Virginica*, there is reference to a statement of Thomas Meehan that it is mentioned in the later edition of Gray's Manual, which Mr. Rehder has failed to verify, Mr. Meehan evidently referred to what is found in a brief characterization of *Chionanthus* among the tribal divisions of *Oleaceae* in the sixth edition, p. 335. It is said of the genus: "Flowers complete, sometimes polygamous." Such a character might be construed as a general one and be referred to the genus as including *C. retusa*. But it is not the custom of the book, designed to help students of the flora to a safe knowledge of what they may expect to find in the area it covers, to put in needless statements. Then this habit of the plants had not been given in former editions where the tribal divisions are also characterized, and the inference from this would be that the polygamy was that of *C. virginica*, the only one of the genus described. The statement not being placed in the full description of the genus or species is easily overlooked.— E. J. Hill, Chicago, Illinois.

Two noteworthy Plants of New Haven, Connecticut.— *Phaseolus perennis*, Walt. was collected by the writer, in flower, on August 18th, 1903, and later in good fruit, in the woods skirting the base of East Rock, New Haven. It makes a vigorous growth here, and the vines cover the low ledges over which they climb. The station is only a few rods from the edge of a salt marsh, and at a slight elevation above it. In Rhodora II : 92, April, 1900, Hon. J. R. Churchill discusses the occurrence of *Phaseolus perennis* in New England, and states that the record for New England rested at that time solely on three specimens all collected more than forty years before at New Haven, Conn. He could find no other New England specimens of the species in our principal herbaria, nor any botanist

who had seen it within our area and inferred that it had disappeared from our flora. It seems probable that the station reported by the present writer is the one from which the New Haven specimens referred to were taken so many years ago, and which had become forgotten. Since Judge Churchill's article was published, Mr. C. H. Bissell has discovered this Phaseolus in Norwalk, Connecticut (RHODORA iv: 13) and Mr. E. B. Harger has reported it from Huntington (RHODORA v: 291). The nearest of these two stations is some ten miles from New Haven and it is not likely that either of them can have been the source of the specimens referred to by Judge Churchill.

On August 3d, 1903, the writer noticed by the roadside on the outskirts of New Haven an unfamiliar grass in full bloom, which proved to be *Molinia coerulea*, Moench. This grass was afterwards found at several places within a mile of the first station, and apparently well established at each place. It continued to flower for several weeks, and is a stately and handsome species.— R. W. WOODWARD, New Haven, Connecticut.

STELLARIA GLAUCA ESTABLISHED IN THE PROVINCE OF QUEBEC.— Among several plants of interest, recently received at the Gray Herbarium from Judge J. R. Churchill, is the European *Stellaria glauca*, Withering. It was collected on the railway which runs from Quebec along the north bank of the St. Lawrence River to Ste. Anne de Beaupré. It was observed at several points along the line, but in particular abundance near a small flag-station about three miles west of Ste. Anne de Beaupré where it was thoroughly established. The species shares the general habit of *S. longifolia*, Muhl., *S. longipes*, Goldie, and *S. graminea*, L., and as it is likely to be found at other American localities, it may be worth while to mention its distinctive features. It is for the genus tall and slender (3 to 5 dm. in height), entirely glabrous and pale green. The leaves are linear and very acute, 2 to 3.5 cm. long and for the most part not over 2 mm. in breadth. At their bases where they are connate by narrow subscarious membranes they are entirely free from ciliation. The flowers are rather large, the petals being 8 to 12 mm. long. In *S. graminea*, *S. longifolia*, and *S. longipes* the petals are only 3 to 6 mm. in length. In the American forms of *S. graminea* and in *S. longifolia* the bases of the

leaves or the membranes connecting them appear always to show at least some vestiges of ciliation, while in S. longipes the leaves are neither so long nor relatively so narrow as they are in *S. glauca.* Since the receipt of the specimens from Judge Churchill, *S. glauca* from the same locality has been sent to the Gray Herbarium by Mr. John Murdock, Jr.— B. L. Robinson.

Some Plants new to the Flora of Maine.— In company with a fellow botanist, Mr. F. M. Billings, I went on an exploring trip September 7th, 1903, which proved a veritable red letter day in the botanical line for us both, as in addition to securing many plants which we knew to occur in the vicinity, though we had previously never personally collected them, we were fortunate enough to secure a few which could not be identified by a most rigorous search of the botanical literature at our command. Our usual resort in such cases is Mr. M. L. Fernald of the Gray Herbarium, and to him the puzzling specimens were sent for identification. A species of which Mr. Billings had secured a single specimen the year previous, growing in some ballast left by an Italian vessel, was found quite abundant in the same locality this season, and on the day in question we secured good specimens. Mr. Fernald pronounced this plant to be *Mercurialis annua* L. and reported that to his knowledge it had never before been recorded from Maine. On the side of a steep railroad embankment Mr. Billings discovered a low spreading prostrate plant which was then almost entirely out of bloom. It was quite abundant and seemed to have been established there for at least one season previously. Mr. Fernald pronounces this plant to be *Anchusa arvalis* Reichenbach, and he adds that it is apparently not recorded in America. On September 30th, Mr. Billings brought me specimens of a plant which Mr. Fernald pronounces to be *Galinsoga parviflora* var. *hispida* DC. These were growing in a waste spot where rubbish and other miscellaneous material was being constantly dumped and might easily have been introduced with material used in packing crockery ware, as such material consisting of straw and similar matter is dumped in this locality. September 30 and October 4th I collected specimens of a Valerian growing in waste places where it might easily have been introduced with refuse from gardens. Mr. Fernald pro-

nounces the species to be *Valerianella olitoria* Poll. This and allied species are sometimes cultivated under the name of "Corn Salad" in this vicinity.— Ora W. Knight, Bangor, Maine.

Note on Equisetum pratense.— *Equisetum pratense*, Ehrh., appears to be very rare in the United States, although more common in Canada and Alaska. It has been reported from New England several times, but erroneously so far as my observations have gone. While attending the meetings of the Josselyn Society of Maine on July 2nd, I explored the south bank of "Old Point," Norridgewock. It is quite steep, perhaps 35 feet high, and made up of sand. Here I noticed a peculiar Equisetum and to my delight found it to be the much-wanted *E. pratense.* It grew down the south face of the bluff and on top among bushes and trees. Later in the day I found it, but sparingly, in a cedar swamp at Madison, which fact shows that its habitat is varied, and that it is presumably common in northern New England. It has been overlooked for the reason that in appearance it is half-way between *E. arvense* and *E. silvaticum*, so that casual observers are likely to take it for one or the other of these species. From the first it may be told, when growing in the sun, by the fact that the top is a little oblique as in *E. silvaticum* while the upper branches are deflexed and then horizontal. In shade it is more pyramidal than *E. arvense*, and the branches are finer. It can be told at once on examination of the stem, even without a lens, as *E. arvense* is smooth, while *E. pratense* is covered by tall, flattish spinules that often give it a gray tinge. It can also be easily separated from *E. silvaticum* by its simple branches, those of the latter species being always compound. *E. pratense* is, in general, a more nearly erect species, the stem usually being quite perpendicular, the oblique appearance where present being caused by the deflexed branches.— A. A. Eaton, North Easton, Mass.

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Willoughby Cliff from the Pasture.

Willoughby Lake through the Notch.

Rhodora

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FLORA OF WILLOUGHBY, VERMONT.

George G. Kennedy.

The approach to Willoughby Notch in old times was from the north; following up Barton River from Lake Memphremagog to the stream, named in Thompson's History of Vermont (1842) Willoughby's River, which flows from Willoughby's Lake between Mt. Pisgah and Mt. Hor. Who this Willoughby may have been I am unable to say, but his name has remained for the region and even the higher easterly mountain is now usually designated as Mt. Willoughby instead of by the older names, Pisgah or Annanance.

The notch lies in the southern corner of Orleans county and about at an equal distance, say 25 miles, from the Canada line on the north and the town of St. Johnsbury on the south: approximately, the latitude is 44° 43′ north, and the longitude is 72° 2′ west from Greenwich. The two mountains and the ridge at the south end of the lake divide the St. Lawrence waters from the Connecticut River tributaries; on the east and south sides of Mt. Willoughby, Mt. Hor and this ridge the streams unite for the Passumpsic river, and flow into the Connecticut; on the west and north sides the waters unite in Barton river, flowing to Lake Memphremagog and the St. Lawrence valley. The hotel and post office are on this ridge at the south end of the lake, three miles from the nearest house to the north, through the notch, and a mile from the next farm south.

The shortest distance to the railroad is to West Burke, a station on the Passumpsic division of the Boston and Maine. This drive of six miles follows the brook through a beautiful country of hill and valley with characteristic northern Vermont cedar (*Thuya occidentalis*) swamps. West Burke railroad station is 810 feet above the sea and

the following measurements of height are considered approximately trustworthy.

Willoughby Lake	1060 ft.
Hotel	1160 "
Pulpit Rock	1700 "
Summit of Mt. Willoughby	2650 "
North Outlook	2410 "
Long Pond	1710 "
Height of land on the Long Pond road N. E. of the mountain.	2170 "

The characteristic botanical features of Willoughby are the wet cliffs and slides on the southwest side of the mountain, and the sphagnous cedar swamps of the brooks, beginning close to the narrow ridge that makes the water-divide, and continuing at intervals for five miles southward. These cedar swamps are, I suppose, not different from others in northern Vermont, but the wet slopes of the notch are not paralleled except with Smuggler's Notch at Mount Mansfield; and yet while the two notches have so many peculiar plants in common, each has some that the other lacks. Of such Smuggler's Notch has *Lycopodium Selago*, L., *Arenaria verna*, L., var. *hirta*, Watson, *Gentiana Amarella*, L., var. *acuta*, Hook. f., *Castilleia pallida* Kunth, var. *septentrionalis* Gray. Willoughby Notch has *Asplenium Ruta-muraria*, L., *Scirpus pauciflorus*, Link, *Rhynchospora capillacea*, Torr., *Braya humilis*, Robinson, *Aster polyphyllus*, Willd.

The Willoughby plants, too, are to be found in a very limited area. It is safe to say that nine-tenths of the non-introduced species can be found in two square miles, having the ridge at the south end of the lake as a center: the northern square mile takes in the lake shore and slopes, ledges and woods of the mountains on either side of the lake; the southern square mile gives us the pastures, wet fields and swamps with their interesting orchids and carices.

The rocks of the district appear to be of calcareous-mica-slate of a coarse consistency in some places as if siliceous, and therefore crumbling in some parts, while in others they are of a firmer slaty texture. The cliffs and ledges of the mountain disintegrate in large or small masses, making a talus at the base of the cliff extending even into the lake. On this slope grow many of the cliff plants evidently torn in sods from the upper ledges. At the south end the talus is covered to a greater depth with humus and the vegetation is more

Shore Road at the South End of the Lake.

Shore Road beyond Roaring Brook.

abundant and the trees larger; in fact at this spot one thinks of the Virginian Alleghanies with beautiful *Viola Canadensis* and *Caulophyceum thalictroides*; while a few hundred feet further north on the slope the trees are smaller, the falling of rock from the cliff more frequent and the characteristic cliff plants appear at the roadside. Further up the road, at the "Devil's Den" the boulders are very large, say from 20 to 40 feet across.

There is considerable lime in the district, not to be noticed in the delicious drinking water so abundantly bursting forth on the southern part of the ridge, but seen here and there in white frosty patches under and about loose rocks, and in one part of the bog below the house spreading over a half-acre meadow to which the name Marl Pond has been given; a pond from four to six inches deep with the water gently moving over a flat bottom, which in all parts except one spot is as hard as a floor. The mosses, ferns and many flowering plants of the region are all more or less those of a limey district.

Slides of earth and rock from the upper part of the cliff have left a series of channeled gravel trails in the higher portion of the wooded talus of the cliff. In many of them water flows for the greater part of the summer, especially at the north and south ends of the precipitous walls; that is, not from the actual summit of the mountain, but from springs part way down the sides. These slides are old features of the mountain, the only recent one occurring about forty years ago near the north end of the cliff, obstructing the then new highway for several days, and made more memorable by happening on the 4th of July, for which reason the slide has always borne that patriotic name.

The so-called "Flower Garden" of the earlier botanists is at the base of the big cliff just referred to and here the wearing away of the mountain has somewhat lessened, and apparently the water which plays so large a part in the disintegration has sought other channels; for the garden of late years is neither so rich in flowers nor so cool a collecting place on a hot day as other parts of the cliff walk. In this respect it differs greatly from Smuggler's Notch where the slides are usually the result of very heavy rains and where the loss of earth on the mountain side has not left such relatively large bare cliffs, and where the mass of earth yet to come down is infinitely greater than at Willoughby. A slide in 1897 at Smuggler's Notch filled the highway with mud three or four feet deep; and the upper surface having in places dried hard enough to walk upon, the mass had a lava-like

consistency, being still soft and muddy below the surface. There is not enough earth at Willoughby for such a slide.

There is no roadway at the base of Mt. Hor on the west side of the lake. A highway was laid out and finished in 1856 on the east side at the base of Mt. Willoughby and is now the post road from West Burke to Westmore village at the outlet of the lake. This highway is certainly one of the most beautiful rural roads in New England, and is fully as much of a flower garden as the base of the cliffs above.

The Lake is some five miles long, a mile or more wide at its northern half and narrowing at its southern end in the notch between the two mountains. Few water plants have been collected in this south part, the precipitous walls of the notch extending apparently into deep water. The northern end has a beach half a mile in length and meadows extending to the water's edge: the prevailing northerly winds tend to drift water plants towards the south end of the lake and such plants have been thus gathered on the south lesser beach.

No mention is made of Willoughby in Wm. Oakes' elaborate catalogue of Vermont Plants,[1] nor have I heard that Oakes ever visited the northeastern part of the state; but in that catalogue Mr. Robbins is named as having collected at Lake Memphremagog and at Brownington, at which latter place in 1829 he obtained *Senecio aureus*, L., var. *lanceolatus*, Oakes, as noted in "Some rare plants of New England."[2] This is *Senecio Robbinsii*, Oakes, of the present list.

Mr. Carey is also named as collecting plants at Lyndon and Sutton on the south side of Willoughby and at Charleston on the north, and all within a dozen miles of the Notch. This Mr. Carey is John Carey, the friend and companion of Asa Gray on his North Carolina trip, who lived at Bellows Falls, Vermont, in 1835 and 1836, and died at an advanced age in England in 1879.[3] How Mr. Carey could have collected *Botrychium simplex*, Hitchcock, at this early date at "Sutton, near the village, on the road leading to Burke,"[4] and not visited the Willoughby Cliffs, however inaccessible they appeared, is to me a mystery.

[1] Oakes in Thompson, Nat. Hist. Vt. (1842) 173–208, reprint 1–36.

[2] Oakes, Hovey's Mag. Hort. vii. (1841) 183.

[3] *Vide* Asa Gray, Biographical notice, Am. Jour. Sci., Ser. 3, xix. (1880) 422.

[4] Oakes, Cat. Vt. Pl. l. c. 207 (35).

North End of the Cliffs, Willoughby Mountain.

Face of the Cliffs, Willoughby Mountain.

Alphonso Wood (1810–1881) was the first botanist to visit Willoughby and publish any names of plants there collected, and the only reference to his visit I have been able to find is in the second edition of his Class Book of Botany,[1] where under *Saxifraga aizoides*, L. and *S. oppositifolia*, L. he says he discovered these in August, 1845, in the clefts of rocks, Willoughby Mt., 500 feet above the lake.

In July, 1852, C. C. Frost and Rev. A. H. Clapp of Brattleboro, Vermont, visited Willoughby and their trip is described by John L. Russell of Salem, Massachusetts, in Hovey's Magazine, for November, 1852.[2] The mountain is there called Pisgah or Annance; the latter a name of "a chief of the St. Francis tribe of Indians." They say "the region had been explored some years previous by Mr. Wood, a botanist of merit, and through whose remarkable discoveries there, our tourist was induced to visit the spot." Forty-seven flowering plants and ferns and four mosses are mentioned as found at Willoughby and as this makes the first list of plants of the region I give it here — a list of names only, no authors cited — but here rearranged more nearly after modern methods.

Hypnum splendens
" crista-castrensis
" umbratum
" cupressiforme
Pteris atropurpurea
Woodsia glabella
Cupressus thyoides
Thuya occidentalis
Calamagrostis Canadensis
Danthonia spicata
Lolium perenne
Muhlenbergia sylvatica
Oryzopsis melanocarpa
Panicum depauperatum
" nitidum
Carex eburnea
" scirpoidea
Clintonia borealis
Anemone cylindrica
" Virginiana
Clematis Virginiana
Arabis lyrata
Draba arabisans
Saxifraga aizoides
" oppositifolia
Fragaria Virginiana
Rosa blanda
Rubus occidentalis
" odoratus
" strigosus
Rubus triflorus
Hedysarum boreale
Phaca Robbinsii
Vitis cordifolia
Helianthemum Canadense
Circaea alpina
Oenothera fruticosa
Primula Mistassinica
Apocynum hypericifolium
Asclepias Cornuti
" quadrifolia
Lonicera ciliata
Campanula rotundifolia
Achillaea Millefolium
Antennaria margaritacea
Artemisia Canadensis
Cirsium lanceolatum
Eupatorium ageratoides
" purpureum
Solidago corymbosus
" lanceolatus

[1] Wood, Class Book., ed. 2 (1847) 279.

[2] J. L. Russell, Hovey's Mag. Hort. xviii. (1852) 481–485.

Although some plants of this list cannot now be identified, it yet contains nearly all the characteristic cliff plants: but evidently no attention was paid to the woods or swamps, though the botanists' route led through rare orchid ground.

In the 1853 appendix to Thompson's History of Vermont, is a list of 105 additions to Wm. Oakes' Catalogue and 19 of these are credited to C. C. Frost from Willoughby. This list was prepared by Prof. Joseph Torrey of Burlington.

Other botanists followed, viz.: Wm. Boott, in 1854, Rev. Joseph Blake in 1861, Horace Mann in 1862, Edwin Faxon in 1873, and many others now living.

The second paper on the flora of Willoughby is by Mr. Chas. E. Ridler [1] giving an interesting account of the approach to the Notch from the north and describing the mountain and its flora. The third paper is by Walter Deane,[2] an account of his collecting trip in July, 1885, with J. R. Churchill. The only other paper I have seen is by Dr. H. H. Rusby reprinted from the Bulletin of Pharmacy, January, 1893, an account of his visit in July and August, 1892. This gives special attention to the oecological features of the district and to the ferns, a list of thirty-two being given.

The present list of 690 names is quite as noteworthy for the plants that are not in it as for those that are. Many of the common things we expect everywhere have not yet been seen in this little area, and many plants have been collected only once, and of others only one or two stations are known. The introduced plants in the Notch itself do not tend to increase and now that the lumbermen have begun a crusade in the swamp region and on the mountain sides the possibility of the destruction of choice botanical areas is alarming. The ferns, orchids and carices of wet woods need the protection of forest trees and certain plants in the Willoughby region are sure to perish.

The map of Willoughby has been drawn by Mr. J. F. Collins of the Botanical Department of Brown University, Providence, Rhode Island, and is believed to be as accurate as the variable material at his disposal would allow.

Unless otherwise noted specimens of all these plants are in my Herbarium, and I shall be glad to receive any additions to this list.

[1] Ridler, Appalachia, iv. (1884) 64.

[2] Deane, Bot. Gaz. xi. (1886) 112.

MAP OF WILLOUGHBY REGION.

FLORA OF WILLOUGHBY, VERMONT.

PTERIDOPHYTA

OPHIOGLOSSACEAE

OPHIOGLOSSUM

O. vulgatum, L. In moist mowing land.

BOTRYCHIUM

B. simplex, Hitch.
B. matricariaefolium, A. Br.
B. ternatum, Swartz, var. **intermedium**, D. C. Eaton.
B. ternatum, Swartz, var. **obliquum**, Milde.
B. ternatum, Swartz, var. **dissectum**, Milde.
B. Virginianum, Swartz.

OSMUNDACEAE

OSMUNDA

O. regalis, L.
O. cinnamomea, L.
O. Claytoniana, L.

POLYPODIACEAE

ONOCLEA

O. sensibilis, L.
O. sensibilis, L., var. **obtusilobata**, Torr.
O. Struthiopteris, Hoffm.

WOODSIA

W. Ilvensis, R. Br. Rocks near Roaring Brook.
W. hyperborea, R. Br. *W. alpina* (Bolton) S. F. Gray. Rare; on the cliffs.
W. glabella, R. Br. Common on the cliffs.

DICKSONIA

D. pilosiuscula, Willd. *D. punctilobula* (Michx.) Gray.

CYSTOPTERIS

C. bulbifera, Bernh.
C. fragilis, Bernh.

ASPIDIUM

A. acrostichoides, Swartz. *Dryopteris acrostichoides* (Michx.) Kuntze.

A. **acrostichoides**, Swartz, var. **incisum**, Gray. *Dryopteris acrostichoides*, var. *Schweinitzii* (Beck) Underw.

A. **aculeatum**, Swartz, var. **Braunii**, Koch. *Dryopteris Braunii* (Spenner) Underw. In deep rocky woods.

A. **Noveboracense**, Swartz. *Dryopteris Noveboracensis* (L.) Gray.

A. **Thelypteris**, Swartz. *Dryopteris Thelypteris* (L.) Gray.

A. **cristatum**, Swartz. *Dryopteris cristata* (L.) Gray.

A. **cristatum**, Swartz, var. **Clintonianum**, D. C. Eaton. In deep swamps.

A. **Goldianum**, Hook. *Dryopteris Goldiana* (Hook.) Gray. Not rare in wet woods. Variable in form.

A. **marginale**, Swartz. *Dryopteris marginalis* (L.) Gray.

A. **spinulosum**, Swartz. *Dryopteris spinulosa* (Retz.) Kuntze. Deep woods near Cold Brook.

A. **spinulosum**, Swartz, var. **intermedium**, D. C. Eaton. *Dryopteris spinulosa*, var. *intermedia* (Muhl.) Underw.

A. **spinulosum**, Swartz, var. **dilatatum**, Hook.

A. **Boottii**, Tuckerm. *Dryopteris Boottii* (Tuckerm.) Underw. In wet woods.

PHEGOPTERIS

P. **polypodioides**, Fée. *P. Phegopteris* (L.) Underw.

P. **Dryopteris**, Feé.

ASPLENIUM

A. **Trichomanes**, L. Mt. Hor, *Edwin Faxon*, 1886.

A. **viride**, Hudson. Cliffs, Mt. Hor, *Mrs. Condit*, 1887. Two fronds in Herb. C. E. Faxon.

A. **Ruta-muraria**, L. Cliffs, Willoughby Mountain; not common.

A. **thelypteroides**, Michx. *A. acrostichoides*, Swartz.

A. **Filix-foemina**, Bernh.

ADIANTUM

A. **pedatum**, L. Rapidly becoming rare from the rapacity of visitors.

PTERIS

P. **aquilina**, L. Seldom simply ternate.

PELLAEA

P. **gracilis**, Hook. *P. Stelleri* (S. G. Gmel.) Watt.

P. **atropurpurea**, Link. Both species on the limestone cliffs.

POLYPODIUM

P. **vulgare**, L. A form with forking frond, *W. A. Lorenz*. Another with very broad frond, *F. G. Floyd*.

EQUISETACEAE

EQUISETUM

E. **arvense**, L.

E. **arvense**, L., approaching forma **pseudo-sylvaticum** *fide* A. A. Eaton.

E. **arvense**, L., var. **nemorosum**, A. Br.

E. **sylvaticum**, L.

E. **limosum**, L. *E. fluviatile*, L.

E. **hyemale**, L. Not common.

E. **scirpoides**, Michx.

LYCOPODIACEAE

LYCOPODIUM

L. **lucidulum**, Michx.

L. **inundatum**, L.

L. **dendroideum**, Michx.

L. **annotinum**, L.

L. **sabinaefolium**, Willd. Top of the mountain, *A. W. Cheever*, 1903.

L. **clavatum**, L.

L. **clavatum**, L., var. **monostachyon**, Grev. & Hook.

L. **complanatum**, L., var. **flabelliforme**, Fernald. Often with peduncles stout, much branched and bearing from 3 to 13 spikes, which are frequently proliferous at the apex.

Lycopodium complanatum, L., var. **Wibbei**, Haberer in Herb. Gray. Branches with the aspect of var. *flabelliforme*, Fernald; strobile solitary, large (3.5 to 4 cm. long).— Swampy woodlands on hills about Utica, New York, September, 1900 (*J. V. Haberer* in Herb. Gray). Dedicated to the late Reverend Father J. Herman Wibbe of Schenectady. This striking plant, the counterpart in the *complanatum* series of *L. clavatum*, var. *monostachyon*, Grev. & Hook., was found in shady cold woods at Willoughby, October 1, 1903. The Willoughby specimens closely match those of Dr. Haberer.

L. **tristachyon**, Pursh. *L. complanatum*, var. *Chamaecyparissus*, D. C. Eaton.

ISOETACEAE

ISOETES

I. **macrospora**, Durieu. *Miss Annie Lorenz*. This species has been determined by Mr. A. A. Eaton.

GYMNOSPERMAE

PINACEAE

PINUS

P. **Strobus**, L. Very rare; hardly to be seen except planted.

LARIX

L. Americana, Michx. *L. laricina* (Du Roi) Koch.

PICEA

P. alba, Link. *P. Canadensis* (Mill.) B. S. P.
P. nigra, Link. Including *P. brevifolia*, Peck. *P. Mariana* (Mill.) B. S. P.
P. rubra, Link. The common "Lumber" Spruce.

TSUGA

T. Canadensis, Carr.

ABIES

A. balsamea, Mill.

THUYA

T. occidentalis, L. Some stumps of old growth cedars, more than three feet in diameter still remain in the Mt. Hor woods.

TAXACEAE

TAXUS

T. Canadensis, Willd. *Taxus minor* (Michx.) Britton.

ANGIOSPERMAE

Monocotyledones

TYPHACEAE

TYPHA

T. latifolia, L.

SPARGANIACEAE

SPARGANIUM

S. simplex, Huds.
S. simplex, Huds., var. **angustifolium**, Engelm. Long Pond.

NAIADACEAE

POTAMOGETON

P. amplifolius, Tuckerm. Long Pond.
P. alpinus, Balbis. Little Pond.
P. heterophyllus, Schreb. Outlet of Long Pond.
P. Spirillus, Tuckerm. Little Pond.
P. heterophyllus, Schreb., var. **graminifolius**, Wats. & Coult.

P. pusillus, L. North part of Willoughby Lake.

P. diversifolius, Raf. Reported from Willoughby in Brainerd, Jones, & Eggleston, Fl. Vt., 1900, page 7, as collected by the late H. G. Jesup, but no specimen can be found in Prof. Jesup's collection nor in the Herbarium of Dartmouth College, Hanover, N. H.

NAIAS

N. flexilis, Rostk. & Schm. Little Pond.

ALISMACEAE

SAGITTARIA

S. latifolia, Willd.

S. arifolia, Nutt.

S. graminea, Michx.

VALLISNERIACEAE

VALLISNERIA

V. spiralis, L. In Bishop's Brook.

GRAMINEAE

PANICUM

P. GLABRUM, Gaudin. *Syntherisma linearis* (Krock) Nash.

P. capillare, L.

P. unciphyllum, Trin. *P. pubescens*, Lam.

P. CRUS-GALLI, L.

SETARIA

S. GLAUCA, Beauv. *Ixophorus glaucus* (L) Nash. In kitchen garden.

S. VIRIDIS, Beav. *Ixophorus viridis* (L) Nash. In farm land.

S. ITALICA, Kunth. *Ixophorus Italicus* (L) Nash. Roadside.

S. ITALICA, Kunth, var. GERMANICA, Richter. Roadside near hotel.

PHALARIS

P. arundinacea, L.

P. ARUNDINACEA, L., var. PICTA, Gray. Roadside escape.

ANTHOXANTHUM

A. ODORATUM, L. Not common.

HIEROCHLOE

H. borealis, R. & S. Rare. Roaring Brook, 1901.

ORYZOPSIS

O. asperifolia, Torr.

O. melanocarpa, Muhl.

MILIUM

M. effusum, L. In woods.

MUHLENBERGIA

M. Mexicana, Trin. In rocky woods.

M. glomerata, Trin. *M. racemosa* (Michx.) B. S. P.

BRACHYELYTRUM

B. aristatum, Beauv. *B. erectum* (Schreb.) Beauv.

PHLEUM

P. PRATENSE, L. Very variable in size.

SPOROBOLUS

S. vaginaeflorus, Vasey. On the slides near Cliff.

CINNA

C. pendula, Trin. *C. latifolia* (Trev.) Griseb.

AGROSTIS

A. ALBA, L. "A viviparous form occurs," *Jones*, Fl. Vt.

A. ALBA, L., var. **VULGARIS**, Thurb. "A small form occurs in cool pastures, sometimes having flowering glume awned" *Jones*, Fl. Vt.

A. scabra, Willd. *A. hyemalis* (Walt.) B. S. P.

A. scabra, Willd., var. **montana**, Tuckerm. On the ledges at top of the mountain.

CALAMAGROSTIS

C. Canadensis, Beauv.

C. Langsdorfii, Trin. *H. H. Rusby*, 1892; *vide* Revision of Calamagrostis by T. H. Kearney, 1898, p. 27.

C. hyperborea, Lange. *Boott*, 1862. *Pringle*, 1877. Including *C. inexpansa* of Brainerd, Jones, & Eggleston, Fl. Vt., not Gray, collected by Prof. L. R. Jones, 11 July, 1900.

C. hyperborea, Lange, var. **Americana**, Kearney. *C. stricta*, Gray, Man. Ed. 6, in part. The more common form.

C. hyperborea, Lange, var. **elongata**, Kearney, *E. & C. E. Faxon*, 1887, Herb. Gray.

TRISETUM

T. subspicatum, Beauv., var. **molle** , Gray. Mountain slides.

AVENA

A. striata, Michx.
A. SATIVA, L. A roadside escape.

DANTHONIA

D. spicata, Beauv.
D. compressa, Aust.

EATONIA

E. Pennsylvanica, Gray.

DACTYLIS

D. GLOMERATA, L.

POA

P. pratensis, L.
P. pratensis, L., var. **angustifolia**, Smith. *Jones* in Fl. Vt.
P. nemoralis, L.
P. ANNUA, L.
P. serotina, Ehrh. *P. flava*, L.
P. alsodes, Gray. Herb. J. R. Churchill.

GLYCERIA

G. Canadensis, Trin. *Panicularia Canadensis* (Michx.) Kuntze.
G. elongata, Trin. *Panicularia elongata* (Torr.) Kuntze.
G. nervata, Trin. *Panicularia nervata* (Willd.) Kuntze.
G. grandis, Watson. *Panicularia Americana* (Torr.) Mac M.
G. pallida, Trin. *Panicularia pallida* (Torr.) Kuntze.

FESTUCA

F. ELATIOR, L.
F. ELATIOR, L., var. PRATENSIS, Gray.

BROMUS

B. ciliatus, L.
B. SECALINUS, L. Field opposite the Hotel.

LOLIUM

L. PERENNE, L.

AGROPYRON

A. repens, Beauv.
A. **Novae-Angliae**, Scrib. Very variable in size of spikelets.
A. **caninum**, R. & S.
A. **caninum**, R. & S., forma **caninoides**, Ramalley, *fide* C. W. Swan.

SECALE

S. cereale, L. Rye. Roadside escape.

HORDEUM

H. vulgare, L. Common barley. In old fields.
H. vulgare, L., var. Aegiceras, Aitchis. Roadside south of the Hotel. (Hooker, Flora British India vii. 371, says cultivated under the name "Bald Barley.")

ELYMUS

E. **Canadensis**, L.

ASPRELLA

A. **Hystrix**, Willd.

CYPERACEAE

DULICHIUM

D. **spathaceum**, Pers. *D. arundinaceum* (L.) Britton.

ELEOCHARIS

E. **obtusa**, Schultes.
E. **palustris**, R. Br.
E. **tenuis**, Schultes.
E. **intermedia**, Schultes. Little Pond Bog.
E. **pygmaea**, Torr. Herb. W. Deane, 1885.

SCIRPUS

S. **pauciflorus**, Lightf. *Eleocharis pauciflora*, Link.
S. **validus**, Vahl. *S. lacustris*, Gray, Man. Ed. 6., not L.
S. **atrovirens**, Muhl.
S. **rubrotinctus**, Fernald.
S. **Peckii**, Britton.
S. **atrocinctus**, Fernald.
S. **atrocinctus**, Fernald, var. **brachypodus**, Fernald.

ERIOPHORUM

E. **alpinum**, L
E. **polystachyon**, L.

E. polystachyon, L., var. **latifolium**, Gray.

E. Virginicum, L.

E. gracile, Koch. *A. W. Cheever*, 1903.

RHYNCHOSPORA

R. alba, Vahl.

R. capillacea, Torr.

CLADIUM

C. mariscoides, Torr.

CAREX

C. intumescens, Rudge.

C. rostrata, Stokes. *C. utriculata*, var. *minor*, Boott.

C. Tuckermani, Dewey. Herbaria of W. Deane and J. R. Churchill, 1885.

C. retrorsa, Schwein.

C. lurida, Wahl.

C. lurida, Wahl., var. **gracilis**, Bailey. *C. Baileyi*, Britton.

C. hystricina, Muhl.

C. hystricina, Muhl., var. **Dudleyi**, Bailey. The species and variety on same plant, *G. G. K.*, 1898.

C. scabrata, Schwein.

C. filiformis, L.

C. stricta, Lam.

C. lenticularis, Michx.

C. gynandra, Schwein

C. gracillima, Schwein.

C. castanea, Wahl. Meadow by the Four Bridges, 1898.

C. arctata, Boott.

C. debilis, Michx., var. **Rudgei**, Bailey. *C. tenuis*, Rudge.

C. flava, L.

C. flava, L., var. **viridula**, Bailey. *C. viridula* Michx.

C. pallescens, L.

C. vaginata, Tausch. *C. saltuensis*, Bailey. *C. altocaulis* (Dewey) Britton. Swamp between West Burke and Willoughby, *Pringle*, 1878, Herb. Gray.

C. laxiflora, Lam.

C. laxiflora, Lam., var. **varians**, Bailey.

C. laxiflora, Lam., var. **patulifolia**, Carey.

C. plantaginea, Lam.

C. platyphylla, Carey.

C. aurea, Nutt.

C. eburnea, Boott. *C. setifolia* (Dewey) Britton.

C. pedunculata, Muhl.

C. communis, Bailey. *C. pedicellata* (Dewey) Britton.

C. albicans, Willd.

C. deflexa, Hornem.

C. scirpoidea, Michx. On the mountain sides and occasionally on Lake roadside.

C. leptalea Wahl. *C. polytrichoides*, Muhl.
C. stipata, Muhl.
C. teretiuscula, Gooden. Little Pond Bog.
C. vulpinoidea, Michx.
C. tenella, Schkuhr.
C. rosea, Schkuhr, var. **minor**, Boott.
C. rosea, Schkuhr, var. **radiata**, Dewey.
C. stellulata, Gooden., var. **angustata**, Carey. *C. sterilis*, Britt. & Brown, in part, not Willd. *C. echinata*, Murr., var. *angustata*, Bailey.
C. interior, Bailey.
C. canescens, L., var. **subloliacea**, Laest.
C. brunnescens, Poir. *C. canescens*, L., var. *alpicola*, Wahl.
C. trisperma, Dewey.
C. Deweyana, Schwein.
C. bromoides, Schkuhr.
C. Bebbii, Olney.
C. tribuloides, Wahl., var. **reducta**, Bailey. *C. tribuloides*, Wahl., var. *moniliformis* (Tuckerm.) Britton.
C. cristata, Schwein. *C. tribuloides*, Wahl., var. *cristata*, Bailey. *C. cristatella*, Britton.
C. scoparia, Schkuhr.
C. scoparia, Schkuhr, var. **condensa**, Fernald. *E. F. Williams*, 1894.
C. Crawfordii, Fernald.
C. mirabilis, Dewey.
C. mirabilis, Dewey, var. **tincta**, Fernald.

ARACEAE

ARISAEMA

A. triphyllum, Torr. In both wet and apparently dry soil.

CALLA

C. palustris, L.

ERIOCAULACEAE

ERIOCAULON

E. septangulare, Withering. At north end of Lake.

JUNCACEAE

JUNCUS

J. effusus, L.
J. bufonius, L. Of all shapes and sizes.
J. tenuis, Willd., var. **Williamsii**, Fernald.
J. Dudleyi, Wiegand.
J. nodosus, L.

J. **alpinus**, Vill. Herb. W. Deane.
J. **articulatus**, L.
J. **brachycephalus**, Buchenau.
J. **brevicaudatus**, Fernald.

LUZULA

L. **parviflora**, *Desv.* *L. spadicea*, DC., var. ***melanocarpa***, Meyer. ***Juncoides parviflorum*** (Ehrh.) Coville.
L. **campestris**, DC., var. **multiflora**, Celakovsky. See Rhodora, vi, 38.

LILIACEAE

VERATRUM

V. **viride**, Ait.

OAKESIA

O. **sessilifolia**, Watson. *Uvularia sessilifolia*, L.

HEMEROCALLIS

H. FULVA, L. Roadside.

ALLIUM

A. **tricoccum**, Ait.
A. SCHOENOPRASUM, L. 1899, new to New England, the Connecticut River valley plant being the larger var. *Sibericum*, Hartm.

LILIUM

L. TIGRINUM, Ker. Roadside by an abandoned cellar.

ERYTHRONIUM

E. **Americanum**, Ker.

CLINTONIA

C. **borealis**, Raf.

SMILACINA

S. **racemosa**, Desf. *Vagnera racemosa* (L.) Morong.
S. **stellata**, Desf. *Vagnera stellata* (L.) Morong.
S. **trifolia**, Desf. *Vagnera trifolia* (L.) Morong. Herb. J. R. Churchill.

MAIANTHEMUM

M. **Canadense**, Desf. *Unifolium Canadense* (Desf.) Greene.

STREPTOPUS

S. **amplexifolius**, DC.
S. **roseus**, Michx.

POLYGONATUM

P. biflorum, Ell.

MEDEOLA

M. Virginiana, L.

TRILLIUM

T. erectum, L.
T. undulatum, Willd. *T. erythrocarpum*, Michx.

IRIDACEAE

IRIS

I. versicolor, L.

SISYRINCHIUM

S. angustifolium, Mill.

ORCHIDACEAE

CYPRIPEDIUM

C. acaule, Ait. Often with white flowers.
C. arietinum, R. Br. *Mrs. J. E. W. Thacher*, 1897.
C. spectabile, Salisb. *C. reginae*, Walt. *E. & C. E. Faxon*, 1887; Herb. Gray.
C. pubescens, Willd. *C. hirsutum*, Mill. The *C. pubescens* of the woods is a different looking plant from the meadow and swamp form, which latter is almost exactly between *C. pubescens*, Willd. and *C. parviflorum*, Salisb.

ORCHIS.

O. spectabilis, L. Found some seasons in profusion and of wonderful beauty.

HABENARIA

H. Hookeri, Torr. *Lysias Hookeriana* (Gray) Rydb. *Dr. C. A. Cheever*, 1903.
H. orbiculata, Torr. *Lysias orbiculata* (Pursh) Rydb.
H. obtusata, Richardson. *Lysiella obtusata* (Pursh) Rydb.
H. hyperborea, R. Br. *Limnorchis hyperborea* (L.) Rydb.
H. dilatata, Gray. *Limnorchis dilatata* (Pursh) Rydb. *Limnorchis fragrans*, Rydb. is hardly to be separated except by its evident fragrance, and perhaps slender form.
H. bracteata, R. Br. *Coeloglossum bracteatum* (Willd.) Parl.
H. tridentata, Hook. *H. clavellata* (Michx.) Spreng.
H. psycodes, Gray. Occasional forms approach *H. fimbriata*, R. Br. but no typical *H. fimbriata* has yet been collected.

POGONIA

P. ophioglossoides, Nutt.

SPIRANTHES

S. Romanzoffiana, Cham. *Gyrostachys Romanzoffiana* (Cham.) MacM.

S. cernua, Richard. *Gyrostachys cernua* (L.) Kuntze.

S. gracilis, Bigel. *Gyrostachys gracilis* (Bigel.) Kuntze.

LISTERA

L. convallarioides, Nutt.

L. cordata, R. Br.

GOODYERA.

G. repens, R. Br., var. **ophioides**, Fernald. *Peramium repens* (L.) Britt. & Brown, not Salisb.

G. tesselata, Lodd.

MICROSTYLIS

M. monophyllos, Lindl. *Achroanthes monophylla* (L.) Greene. Very rare; on the side of Mt. Hor.

M. ophioglossoides, Nutt. *Achroanthes unifolia* (Michx.) Raf.

LIPARIS

L. Loeselii, Richard. *Leptorchis Loeselii* (L.) MacM. Meadow, rare.

CALYPSO

C. borealis, Salisb. *C. bulbosa* (L.) Oakes. In deep and cold cedar swamps.

CORALLORHIZA

C. innata, R. Br. Two specimens of *C. innata*, found June 4, 1901, in dense shade in swampy woods, show the condition known as irregular peloria. In this case a conversion of the petals into normal or nearly normal lips gives a remarkable appearance to the flowering spike. This is more common in cultivated orchids than in wild plants and I have to thank Mr. Oakes Ames for explaining to me the singular anomaly in these specimens.

C. multiflora, Nutt.

Dicotyledons.

JUGLANDACEAE

JUGLANS

J. cinerea, L.

MYRICACEAE

MYRICA

M. Gale, L.

SALICACEAE

POPULUS

P. balsamifera, L. The leaf-bud has a resinous odor of watchmakers' oil rather than the fragrant odor of var. *candicans*, the Balm of Gilead.

P. tremuloides, Michx.

P. grandidentata, Michx.

SALIX

S. nigra, Marsh, var. **falcata**, Torr. North beach on Lake.

S. lucida, Muhl.

S. purpurea, L. Large clump on roadside towards Chemical Pond.

S. rostrata, Richardson. *S. Bebbiana*, Sarg.

S. humilis, Marsh.

S. discolor, Muhl.

S. petiolaris, Smith. On beach at north end of Lake, *Miss A. Lorenz*.

S. cordata, Muhl.

S. balsamifera, Barratt. Quite frequent.

CUPULIFERAE

OSTRYA

O. Virginica, Willd.

CORYLUS

C. rostrata, Ait.

BETULA

B. alba, L., var. **papyrifera**, Spach. *B. papyrifera*, Marsh.

B. alba, L., var. **cordifolia**, Fernald.

B. lenta, L.

B. lutea, Michx. f.

ALNUS

A. viridis, DC. *A. Alnobetula* (Ehrh.) K. Koch. Very common.

A. incana, Willd.

FAGUS

F. ferruginea, Ait. *F. Americana*, Sweet.

QUERCUS

Q. rubra, L. On "4th of July" and other slides; not seen elsewhere.

URTICACEAE

ULMUS

U. Americana, L.
U. fulva, Michx. In the woods at base of the mountain.

HUMULUS

H. Lupulus, L. At Sutton Road corner.

LAPORTEA

L. Canadensis, Gaudichaud. *Urticastrum divaricatum* (L.) Kuntze.

ARISTOLOCHIACEAE

ASARUM

A. Canadense, L. Rare.

POLYGONACEAE

RHEUM

R. Rhapontium, L. In a wild farm pasture, escaped.

RUMEX

R. Acetosella, L.
R. crispus, L.
R. obtusifolius, L.

FAGOPYRUM

F. esculentum, Moench.
F. Tataricum, Gaertn.

POLYGONUM

P. Persicaria, L.
P. Hydropiper, L.
P. aviculare, L.
P. Convolvulus, L.
P. cilinode, Michx.
P. sagittatum, L.

CHENOPODIACEAE

CHENOPODIUM

C. album, L.
C. capitatum, Watson. *Blitum capitatum*, L. Near the farm-barn.

AMARANTHACEAE

AMARANTHUS

A. RETROFLEXUS, L. Called Rag-weed and said to have come from the West, thus indicating a comparatively recent introduction.

PORTULACACEAE

CLAYTONIA

C. Caroliniana, Michx.

PORTULACA

P. OLERACEA, L.

CARYOPHYLLACEAE

AGROSTEMMA

A. GITHAGO, L. *Lychnis Githago*, Scopoli.

SILENE

S. CUCUBALUS, Wibel. *S. vulgaris* (Moench) Garcke. Roadside near Chemical Pond.

S. NOCTIFLORA, L. Near Picnic house at Lake.

LYCHNIS

L. CHALCEDONICA, L. Escape at Sheffield Landing.

SAPONARIA

S. OFFICINALIS, L.

S. VACCARIA, L. *Vaccaria Vaccaria* (L.) Britton. Herb. Walter Deane, 1885.

DIANTHUS

D. BARBATUS, L. Escape.

STELLARIA

S. MEDIA, Cyrill. *Alsine media*, L.

S. GRAMINEA, L. *Alsine graminea* (L.) Britton.

S. borealis, Bigel. *Alsine borealis* (Bigel.) Britton.

CERASTIUM

C. VULGATUM, L.

SPERGULA

S. ARVENSIS, L.

NYMPHAEACEAE

NUPHAR

N. advena, Ait. f. *Nymphaea advena,* Soland.

N. advena, Ait. f., var. **hybridum,** Peck. *N. advena,* Ait. f., var. *minus,* Morong.

N. minimum, Smith. *Nymphaea Kalmiana* (Michx.) Sims.

NYMPHAEA

N. ODORATA, Ait. *Castalia odorata* (Dryand.) Woodv. & Wood.' Planted in Little Pond.

RANUNCULACEAE

CALTHA

C. palustris, L. In both wet and apparently dry places.

COPTIS

C. trifolia, Salisb.

ACTAEA

A. rubra Willd.

A. alba, Bigel. Very variable as to pedicels and color of fruit.

PAEONIA

P. OFFICINALIS, Retz. Persistent in an old orchard.

AQUILEGIA

A. VULGARIS, L. Roadside escape.

ACONITUM

A. NAPELLUS, L. An escape on the Newark Road.

ANEMONE

A. riparia, Fernald. All the Anemone reports from Russell's in 1852 to the present time are now to be referred to Mr. Fernald's *A. riparia.*

HEPATICA

H. acutiloba, DC. *H. acuta* (Pursh) Britton.

CLEMATIS

C. Virgininana, L.

C. verticillaris, DC. *Atragene Americana,* Sims. Occasional.

RANUNCULUS

R. abortivus, L.
R. recurvatus, Poir.
R. ACRIS, L.
R. repens, L.
R. septentrionalis, Poir.
R. aquatilis, L., var. **trichophyllus**, Gray. *Batrachium trichophyllum* (Chaix) Bossch.

THALICTRUM

T. polygamum, Muhl.

BERBERIDACEAE

CAULOPHYLLUM

C. thalictroides, Michx. In mountain woods.

PAPAVERACEAE

SANGUINARIA

S. Canadensis, L. Rare.

DICENTRA

D. Cucullaria, DC. *Bicuculla Cucullaria* (L.) Millsp. In mountain woods.
D. Canadensis, DC. *Bicuculla Canadensis* (Goldie) Millsp. On the mountain.

CRUCIFERAE

LEPIDIUM

L. VIRGINICUM, L.

SISYMBRIUM

S. OFFICINALE, Scop.

BRAYA

B. humilis, Robinson. *Sisymbrium humile*, Meyer. Probably from its abundance on the Cliffs the *Arabis lyrata* of Mr. Russell's 1852 List.

BRASSICA

B. JUNCEA, Cosson.
B. SINAPISTRUM, Boiss. *B. arvensis* (L.) B. S. P.
B. CAMPESTRIS, L.

RAPHANUS

R. RAPHANISTRUM, L.

BARBAREA

B. STRICTA, Andrz. *B. vulgaris*, Gray, Man. Ed. 6, in part.

NASTURTIUM

N. **terrestre**, R. Br. *N. palustre*, DC. *Roripa palustris* (L.) Bess.
N. OFFICINALE, R. Br. *Roripa Nasturtium* (L.) Rusby.
N. ARMORACIA, Fries. *Roripa Armoracia* (L.) A. S. Hitchcock. Fruiting specimen in Herb. J. R. Churchill.

CARDAMINE

C. **Pennsylvanica**, Muhl.

DENTARIA

D. **diphylla**, L. Quite variable as to foliage, but always with the *diphylla* rootstock.

CAPSELLA

C. BURSA-PASTORIS, Moench. Very variable in size and foliage.

DRABA

D. **incana**, L.
D. **incana**, L., var. **arabisans**, Watson.

DROSERACEAE

DROSERA

D. **rotundifolia**, L.

CRASSULACEAE

SEDUM

S. TELEPHIUM, L. Escape by edge of woods, Cheney Place.
S. ACRE, L. On old wall.

SAXIFRAGACEAE

SAXIFRAGA

S. **oppositifolia**, L. Common on the cliffs.
S. **aizoides**, L. On the cliffs.
S. **Aizoon**, Jacq. On the upper portions of cliffs.
S. **Virginiensis**, Michx.

TIARELLA

T. **cordifolia**, L.

MITELLA

M. nuda, L.

CHRYSOSPLENIUM

C. Americanum, Schwein.

PARNASSIA

P. Caroliniana, Michx. In wet pastures.

RIBES

R. Cynosbati, L.
R. oxyacanthoides, L.
R. lacustre, Poir.
R. prostratum, L'Hér.
R. floridum, L'Hér.
R. albinervium, Michx. *R. rubrum*, L., var. *subglandulosum*, Maxim. *R. rubrum*, Britt. & Brown, in part, not L.

ROSACEAE

SPIRAEA

S. latifolia, Borkh. *S. salicifolia*, Gray, Man. Ed. 6, in part, not L.
S. tomentosa, L.

RUBUS

R. odoratus, L.
R. Idaeus, L., var. **strigosus**, Maxim. *R. strigosus*, Michx.
R. occidentalis, L. Herb. Walter Deane, 1885; not common.
R. triflorus, Richardson. *R. Americanus* (Pers.) Britton.
R. setosus, Bigel.
R. Canadensis, L. *R. Millspaughii*, Britton.

DALIBARDA

D. repens, L. Not common.

FRAGARIA

F. Virginiana, Mill.
F. Americana, Britton. *F. vesca*, Gray, Man. Ed. 6, in great part.

POTENTILLA

P. Norvegica, L. *P. Monspeliensis*, L. Variable.
P. fruticosa, L. Not common.
P. Canadensis, L. A plant reported under this name was probably *P. simplex*, Michx.

GEUM

G. rivale, L.
G. strictum, Ait.

AGRIMONIA

A. striata, Michx. *A. Brittoniana*, Bickn.

ROSA

R. blanda, Ait. On the cliffs, and rocky roadside.
R. Carolina, L., var. **setigera**, Crépin. In wet wood road.

PYRUS

P. Americana, DC. *Sorbus Americana*, Marsh.
P. Sitchensis, Piper. *P. sambucifolia*, Gray, Man. Ed. 6, not Cham. & Schl. *Sorbus sambucifolia*, Britt. & Brown, not Roem.
P. Malus, L. Growing wild in many places.
P. arbutifolia, L., var. **melanocarpa**, Hook. *Aronia nigra* (Willd.) Britton. Rare, Marl Pond bog.

AMELANCHIER

A. oligocarpa, Roem.

CRATAEGUS

C. media, Sarg.
C. flabellata, Bosc.

PRUNUS

P. nigra, Ait.
P. Pennsylvanica, L. f. Very variable in size of tree and fruit.
P. Virgininana, L.
P. serotina, Ehrh.

LEGUMINOSAE

MELILOTUS

M. alba, Desr.

TRIFOLIUM

T. pratense, L.
T. incarnatum, L.
T. hybridum, L.
T. repens, L.
T. agrarium, L.

ROBINIA

R. viscosa, Vent. Roadside tree near Sheffield Landing.

ASTRAGALUS

A. Blakei, Eggleston. Common on the slides and down to Lake roadside; different from *A. Robbinsii*, Gray.

HEDYSARUM

H. boreale, Nutt. *H. Americana* (Michx.) Britton. On the slides.

OXALIDACEAE

OXALIS

O. Acetosella, L.

O. cymosa, Small. *O. cornicula* and *O. stricta* of authors in part, not L.

LINACEAE

LINUM

L. USITATISSIMUM, L. In field.

EUPHORBIACEAE

EUPHORBIA

E. CYPARISSIAS, L.

CALLITRICHACEAE

CALLITRICHE

C. verna, L. *C. palustris*, L.

ANACARDIACEAE

RHUS

R. typhina, L. *R. hirta* (L.) Sudw.

R. Toxicodendron, L. *R. radicans*, L. Only on the mountain slides.

AQUIFOLIACEAE

ILEX

I. verticillata, Gray.

NEMOPANTHUS

N. fascicularis, Raf. *Iliciodes mucronata* (L.) Britton.

CELASTRACEAE

CELASTRUS

C. scandens, L. Not common.

ACERACEAE

ACER

A. rubrum, L.
A. Saccharum, Marsh. *A. saccharinum*, Wang., not L.
A. nigrum, Michx. Said to grow at the north end of the lake.
A. Pennsylvanicum, L.
A. spicatum, Lam.

BALSAMINACEAE

IMPATIENS

I. biflora, Walt. *I. fulva*, Nutt.
I. aurea, Muhl. *I. pallida*, Nutt. Only on Mt. Hor side of the Lake.

RHAMNACEAE

RHAMNUS

R. alnifolia, L'Hér. In wet pastures.

VITACEAE

VITIS

V. vulpina, L. Abundant on the mountain slides.

AMPELOPSIS

A. quinquefolia, Michx. *Parthenocissus quinquefolia* (L.) Planch.

TILIACEAE

TILIA

T. Americana, L.

MALVACEAE

MALVA

M. ALCEA, L. Garden escape, Newark Road.
M. MOSCHATA, L. Frequent on Long Pond Road.

HYPERICACEAE

HYPERICUM

H. PERFORATUM, L.
H. maculatum, Walt.
H. boreale, Bickn.
H. mutilum, L.

H. Canadense, L.

H. Virginicum, L. *Elodes campanulata*, Pursh. *Triadenum Virginicum* (L.) Raf.

VIOLACEAE

VIOLA

V. cucullata, Ait.

V. venustula, Greene. Wet places on the slides. President Brainerd writes that this is hardly distinct from *V. affinis*, Le Conte.

V. Selkirkii, Pursh. Very variable; in more or less shaded places.

V. blanda, Willd.

V. amoena, Le Conte. *V. blanda*, var. *palustriformis*, Gray.

V. renifolia, Gray.

V. rotundifolia, Michx.

V. pubescens, Ait.

V. scabriuscula, Schwein.

V. Canadensis, L.

V. conspersa, Reichenb. *V. canina*, L., var. *Muhlenbergii*, Gray, Man, Ed. 6.

V. TRICOLOR, L. Well established in various places.

THYMELACEAE

DIRCA

D. palustris, L. On the big slide.

ONAGRACEAE

EPILOBIUM

E. angustifolium, L. *Chamaenerion angustifolium* (L.) Scop.

E. lineare, Muhl.

E. strictum, Muhl.

E. coloratum, Muhl.

E. adenocaulon, Haussk.

OENOTHERA

O. biennis, L. *Onagra biennis* (L.) Scop.

O. pumila, M. *Kneiffia pumila* (L.) Spach.

CIRCAEA

C. Lutetiana, L. Rare. *E. F. Williams*, 1894.

C. alpina, L.

HALORRHAGIDACEAE

HIPPURIS

H. vulgaris, L. Deep brook in swamp; submerged form.

ARALIACEAE

ARALIA

A. racemosa, L.
A. nudicaulis, L.
A. hispida, Vent.

PANAX

P. quinquefolium, L. *Aralia quinquefolia*, Dec. & Pl. Rare.

UMBELLIFERAE

HERACLEUM

H. lanatum, Michx.

PASTINACA

P. SATIVA, L. Escape.

SANICULA

S. Marylandica, L.

OSMORRHIZA

O. brevistylis, DC. *Washingtonia Claytoni* (Michx.) Britton.

ZIZIA

Z. aurea, Koch. Very common.

LEVISTICUM

L. OFFICINALE, Koch. Old garden on deserted farm near Green Tunnel.

CARUM

C. CARUI, L. Very common.

CICUTA

C. bulbifera, L. Little Pond bog.

HYDROCOTYLE

H. Americana, L.

CORNACEAE

CORNUS

C. Canadensis, L.
C. circinata, L'Hér.
C. stolonifera, Michx. Not so common as would be expected.
C. alternifolia, L. f.

ERICACEAE

PYROLA

P. chlorantha, Swartz.
P. elliptica, Nutt.
P. rotundifolia, var. **uliginosa,** Gray. Little Pond Bog. *P. uliginosa*, Torr.
P. asarifolia, Michx. Lake roadside, 1901.
P. secunda, L.
P. secunda, L., var. **pumila,** Gray.

MONESES

M. grandiflora, Salisb. *M. uniflora* (L.) Gray.

CHIMAPHILA

C. umbellata, Nutt.

MONOTROPA

M. uniflora, L.
M. Hypopitys, L. *Hypopitys Hypopitys* (L.) Small.

KALMIA

K. angustifolia, L. Not common.
K. glauca, Ait.

LEDUM

L. Groenlandicum, Oeder. *L. latifolium*, Ait. Not common.

RHODODODENDRON

R. Rhodora, Don. *Rhodora Canadensis*, L. Rare.

ANDROMEDA

A. glaucophylla, Link. A large patch in dry field. *A. polifolia* of Am. authors in part, not L.

CHAMAEDAPHNE

C. calyculata, Moench. *Cassandra calyculata*, Don. Common.

EPIGAEA

E. repens, L. Many people have noticed in the early autumn a sweet odor in the woods and have usually tried to find a late blossoming Epigaea or Linnaea as its source ; but it is probably the Fragrant Fungus, *Lentinus*

suavissimus, Fries, a species identified for me by Prof. W. G. Farlow and occurring on willows, but observed by me at Willoughby on the common alder, *Alnus incana*, Willd.

GAULTHERIA

G. procumbens, L. Not common.

VACCINIUM

V. Canadense, Kalm. Not common.

V. Vitis-Idaea, L., var. **minus**, Loddiges. This interesting plant, recorded in Vermont only from the summits of Mansfield and Camel's Hump mountains, has increased its area at Willoughby since I first noticed it on June 4th, 1901.

V. Oxycoccus, L., var. **intermedium**, Gray. *Oxycoccus Oxycoccus* (L.) MacM.

CHIOGENES

C. serpyllifolia, Salisb. *C. hispidula* (L.) T. & G.

PRIMULACEAE

PRIMULA

P. Mistassinica, Michx. Abundant on the ledges of the mountain and spreading in many wet fields.

LYSIMACHIA

L. stricta, Ait. *L. terrestris* (L.) B. S. P.

L. thyrsiflora, L. *Naumbergia thyrsiflora* (L.) Duby. Sheffield Landing.

STEIRONEMA

S. ciliatum, Raf.

TRIENTALIS

T. Americana, Pursh.

OLEACEAE

SYRINGA

S. vulgaris, L. Common on the roadside.

FRAXINUS

F. Americana, L.

F. nigra, Marsh. *F. sambucifolia*, Lam.

GENTIANACEAE

GENTIANA

G. linearis, Froel. In one meadow only.

MENYANTHES

M. trifoliata, L. Rare.

APOCYNACEAE

VINCA

V. minor, L. Abundant in one place in cold swamp near outlet of lake. A strange habitat.

APOCYNUM

A. medium, Greene.

A. cannabinum, L. Including the var. *glaberrimum*, DC.

ASCLEPIADACEAE

ASCLEPIAS

A. Syriaca, L. *A. Cornuti*, Dec.

CONVOLVULACEAE

CONVOLVULUS

C. sepium, L.

BORAGINACEAE

MYOSOTIS

M. palustris, Withering. Not common.

LABIATAE

SCUTELLARIA

S. lateriflora, L.

S. galericulata, L.

NEPETA

N. Glechoma, Benth. *Glecoma hederacea*, L. Old cellar wall by roadside.

LAMIUM

L. maculatum, L. *A. W. Cheever*, 1903.

PRUNELLA

P. vulgaris, L.

GALEOPSIS

G. TETRAHIT, L. Flowers often white.

LEONURUS

L. CARDIACA, L.

STACHYS

S. palustris, L. *Miss A. Lorenz*, 1900.

MONARDA

M. DIDYMA, L. On Newark road; an escape.

CALAMINTHA

C. Clinopodium, Benth. *Clinopodium vulgare*, L.

LYCOPUS

L. sinuatus, Ell. *L. Americanus*, Muhl.
L. rubellus, Moench.
L. uniflorus, Michx. *L. Virginicus*, in part, of authors.

MENTHA

M. VIRIDIS, L. *M. spicata*, L. In one place in a wet field.
M. PIPERITA, L.
M. arvensis, L.
M. arvensis, L., var. **Canadensis**, Briquet. *M. Canadensis*, L.

SOLANACEAE

PHYSALIS

P. heterophylla, Nees. *P. Virginiana*, Gray Man. Ed. 6, not Mill.

SCROPHULARIACEAE

VERBASCUM

V. THAPSUS, L.

LINARIA

L. VULGARIS, Mill. *L. Linaria* (L.) Karst.

CHELONE

C. glabra, L.

VERONICA

V. LONGIFOLIA, L. On roadside near Long Pond.

V. Americana, Schw.

V. serpyllifolia, L., var. **borealis**, Laestad.

LENTIBULARIACEAE

UTRICULARIA

U. cornuta, Michx.

U. clandestina, Nutt. Little Pond, 1896.

U. intermedia, Hayne.

OROBANCHACEAE

OROBANCHE

O. uniflora, L. *Thalesia uniflora* (L.) Britton. ***Aphyllon uniflorum***, Gray. In great abundance in 1898 on Lake roadside, but not noted before or since.

EPIPHEGUS

E. Virginiana, Bart. *Leptamnium Virginianum* (L.) Raf. Common in beech woods.

PLANTAGINACEAE

PLANTAGO

P. MAJOR, L. Often with leafy spikes, as noticed also in Canada.

P. MAJOR, L., var. MINIMA, Dec. Very small and slender and of various forms.

P. Rugelii, Dec.

P. LANCEOLATA, L. Not common.

RUBIACEAE

MITCHELLA

M. repens, L.

GALIUM

G. lanceolatum, Torr.

G. triflorum, Michx.

G. trifidum, L.

G. Claytoni, Michx.

G. asprellum, Michx.

CAPRIFOLIACEAE

SAMBUCUS

S. Canadensis, L.

S. racemosa, L. *S. pubens*, Michx.

VIBURNUM

V. alnifolium, Marsh. *V. lantanoides*, Michx. Abundant.
V. Opulus, L. Not common.
V. cassinoides, L. Not common.

LINNAEA

L. borealis, L. *L. Americana*, Forbes.

SYMPHORICARPOS

S. racemosus, Michx. Escape by roadside.

LONICERA

L. caerulea, L.
L. oblongifolia, Muhl.
L. Canadensis, Marsh. *L. ciliata*, Muhl.

DIERVILLA

D. trifida, Moench. *D. Diervilla* (L.) MacM.

CUCURBITACEAE

ECHINOCYSTIS

E. lobata, T. & G. *Micrampelis lobata* (Michx.) Greene. Near the Hotel in field.

CAMPANULACEAE (incl. Lobeliaceae)

CAMPANULA

C. rotundifolia, L.
C. rapunculoides, L. Long Pond road.

LOBELIA

L. Dortmanna, L. At north end of Lake.
L. inflata, L.
L. Kalmii, L. On the slides and in wet fields.

COMPOSITAE

EUPATORIUM

E. maculatum, L.
E. perfoliatum, L.
E. ageratoides, L. This seems to be *E. boreale*, Greene.

SOLIDAGO

S. latifolia, L. *S. flexicaulis*, L.

S. bicolor, L.

S. bicolor L., var. **concolor**, T. & G. *S. hispida*, Muhl. Very abundant and the most noticeable roadside golden-rod.

S. macrophylla, Pursh. In woods on the mountain.

S. Virgaurea, L., var. **Randii**, Porter.

S. Virgaurea, L., var. **monticola**, Porter.

S. Virgaurea, L., var. **Redfieldii**, Porter.

S. Virgaurea, L., betw. var. **Randii** & var. **Redfieldii**.

S. Virgaurea, L., betw. var. **Randii** & var. **monticola**. The varieties of *S. Virgaurea* generally in exposed sunny situations.

S. humilis, Pursh. *S. Purshii*, Porter.

S. uliginosa, Nutt.

S. rugosa, Mill.

S. Canadensis, L., var. **glabrata**, Porter.

S. nemoralis, Ait.

S. lanceolata, L. *Euthamia graminifolia* (L.) Nutt.

ERIGERON

E. hyssopifolius, Michx. On the slides.

E. bellidifolius, Muhl. *E. pulchellus*, Michx.

E. Philadelphicus, L.

E. annuus, Pers.

E. strigosus, Muhl. *E. ramosus* (Walt.) B. S. P.

E. Canadensis, L. *Leptilon Canadense* (L.) Britton.

ASTER

A. divaricatus, L. *A. corymbosus*, Ait.

A. macrophyllus, L.

A. cordifolius, L.

A. polyphyllus, Willd. *A. Faxoni*, Porter. On the mountain ledges and even down to the roadside.

A. diffusus, Ait. *A. lateriflorus* (L.) Britton.

A. diffusus, Ait., var. **hirsuticaulis**, Gray.

A. paniculatus, Lam.

A. paniculatus, Lam., var. **lanatus**, Fernald, n. var. "Stem 1 m. high, white-villous or -lanate: leaves elongate-lanceolate, long-acuminate, 1 to 1.5 dm. long, 1 to 1.5 cm. wide, scabrous above, glabrous beneath or slightly pubescent on the midribs, sharply serrate, as in the species: heads many, paniculate, as in typical *A. paniculatus*. — West Burke Road, Willoughby, Vermont, July 20, 1896 (*E. F. Williams*); Sutton Road, Willoughby, Sept. 4, 1896 (*G. G. Kennedy*); Punk Island, Lake Winnipeg, Manitoba, July 6, 1884 — type (*J. M. Macoun*). Distinctly a form of

A. paniculatus, but distinguished by its striking pubescence similar to that of *A. longifolius*, var. *villicaulis*, *A. cordifolius*, var. *Furbishiae*, and *A. tardiflorus*, var. *vestitus*."

A. paniculatus, Lam., var. **bellidiflorus**, Burgess.

A. longifolius, Lam. 1898. Rare, or some seasons not observed.

A. tardiflorus, L.

A. tardiflorus, L., var. **vestitus**, Fernald.

A. puniceus, L.

A. umbellatus, Mill. *Doellingeria umbellata* (Mill.) Nees.

A. acuminatus, Michx. Including the form with chaffy scales instead of flowers.

ANTENNARIA

A. Canadensis, Greene.

A. fallax, Greene.

A. neodioica, Greene.

A. neodioica, Greene, var. **grandis**, Fernald.

A. neglecta, Greene.

A. petaloidea, Fernald.

ANAPHALIS

A. margaritacea, Benth. & Hook. f.

GNAPHALIUM

G. polycephalum, Michx. *G. obtusifolium*, L.

G. decurrens, Ives.

G. uliginosum, L.

INULA

I. HELENIUM, L. A large plant beside brook on Long Pond Road which I have never seen in flower.

RUDBECKIA

R. HIRTA, L.

HELIANTHUS

H. ANNUUS, L.

H. TUBEROSUS, L. In dooryard.

BIDENS

B. frondosa, L.

B. cernua, L.

ACHILLEA

A. Millefolium, L. Flowers varying to deep red color.

CHRYSANTHEMUM

C. LEUCANTHEMUM, L., var. SUBPINNATIFIDUM, Fernald. (See RHODORA, v. 181).

C. BALSAMITAE, L., var. TANACETOIDES, Boiss. A roadside escape.

TANACETUM

T. VULGARE, L.

T. VULGARE, L., var. CRISPUM, DC.

ARTEMISIA

A. **Canadensis**, Michx. On the cliffs and slides.

A. ABROTANUM, L. A garden escape.

A. VULGARIS, L. Said to be a recent introduction from Canada; one farmer said within 25 years.

A. PONTICA, L. Garden escape on the Long Pond Road.

TUSSILAGO

T. FARFARA, L. Abundant.

PETASITES

P. **palmata**, Gray. Considered rare in the swamps, but appeared in 1901 in great abundance at the southern end of lake in the waste sawdust from an old and abandoned saw mill.

SENECIO

S. **Robbinsii**, Oakes. Very common.

ERECHTITES

E. **prealta**, Raf. *E. hieracifolia*, Raf. Lake roadside, 1903. Not before reported in the neighborhood, but two plants were observed Oct. 1, 1903, near Roaring Brook after the building of a new lake wall at that part of the roadway. It will be interesting to note if the one plant left uncollected will establish a colony.

ARCTIUM

A. MINUS, Bernh.

A. LAPPA, L. *A. Lappa*, var. *majus*, Gray.

CIRSIUM (Cnicus of many authors)

C. LANCEOLATUM, Scop. *Carduus lanceolatus*, L.

C. **muticum**, Michx. *Carduus muticus* (Michx.) Pers.

C. ARVENSE, Scop. *Carduus arvensis* (L.) Robs.

TRAGOPOGON

T. pratensis, L. Herb. E. F. Williams, 1898.

HIERACIUM

H. aurantiacum, L. This plant, elsewhere a noxious weed, is apparently not spreading, as was feared.

H. scabrum, Michx.

TARAXACUM

T. officinale, Weber.

SONCHUS

S. asper, Vill.

S. arvensis, L. *Mrs. Brucke*, 1899.

LACTUCA

L. Canadensis, L.

L. Canadensis, L., var. **integrifolia**, Gray. *L. sagittifolia*, Ell.

L. hirsuta, Muhl.

L. leucophaea, Gray. *L. spicata* (Lam.) Hitchc.

PRENANTHES

P. trifoliolata, Fernald, var. **nana**, Fernald. *Nabalus nana* (Bigel.) DC. Collected by Dr. H. H. Rusby in 1892 on the top of Willoughby Mountain and not reported since that date. Herb. H. H. Rusby.

P. altissima, L. *Nabalus altissimus* (L.) Hook. Very common.

Readville, Massachusetts.

THE IDENTITY OF MICHAUX'S LYCOPUS UNIFLORUS.

M. L. Fernald.

In a recent manual of the northern flora the plant which has generally passed as *Lycopus virginicus*, L., is divided into two leading groups. The first with leaves mostly ovate and the base of the stem not tuberous contains a single species, which is identified with reasonable certainty as *L. virginicus*; the other group, with leaves mostly lanceolate to oblong and with the bases of the stems tuberous, contains plants which are treated without reservation as two new species: *L. communis*,[1] a firm-leaved plant of "moist soil," and *L. membranacea*,[1]

[1] Bicknell in Britton, Man. (1901) 803, 804.

a larger thin-leaved plant of "wet woods." With the exception of a corolla-distinction which proves very inconstant in material examined, the characters by which these two narrow-leaved tuberous-based plants are separated are such that it would seem quite impossible to distinguish from *L. membranacea* large shade states of *L. communis*, while on the other hand it would appear equally difficult to distinguish from *L. communis* open-soil states of *L. membranacea*.

This attempt, however, to distinguish the shade state of the northern plant from the smaller firmer-leaved plant of open moist soil was made more than seventy years ago, while Michaux, more than a century since, recognized that the northern tuberous plant was specifically separable from the rarely tuberous *L. virginicus* of the South.

Michaux's material of *Lycopus uniflorus*,[1] as represented in his herbarium at the Jardin des Plantes in Paris, consists of four small specimens with the characteristic tuberous bases, but all very immature, only one of the plants beginning to show young flowers — hence the specific name. The specimens came from near Lake St. John in Quebec and except that they are very immature they are closely matched by specimens of the common northern plant collected in Cape Breton by John Macoun and distributed as no. 20,023 from the Herbarium of the Geological Survey of Canada.

Immediately after the publication of Michaux's Flora, Vahl described *Lycopus pumilus*.[2] This was based alone upon Michaux's material in the herbarium of Jussieu (Jardin des Plantes) and Michaux's description of *L. uniflorus* was quoted. The only supplementary information furnished by Vahl was that the plant had lanceolate (rather than oval), subserrate (rather than dentate) leaves, and procumbent small stolons.

In 1833 Bentham, likewise, recognized the Michaux plant, as *Lycopus virginicus*, *β pauciflorus*,[3] citing both *L. uniflorus* and *L. pumilus* as absolute synonyms; and an interesting sheet from the herbarium of the late Jacques Gay, now preserved in the herbarium of the Royal Gardens at Kew, shows that Gay appreciated the distinctions between the northern and the southern plants which have passed in America as *Lycopus virginicus*. The original label in Gay's handwriting reads :—

[1] L. "UNIFLORUS. L. pusillus, radice tuberosa : caulibus simplicibus : foliis ovalibus, obtusis, obsolete dentatis : axillis unifloris. *Hab.* ad Lacus *S-Joannis* et *Mistassins*." — Michx. Fl. i (1803) 14.

[2] Vahl. Enum. i (1804) 211. [3] Benth. Lab. (1833) 185.

"Lycopus virginicus La Pyl. Herb. non Linn. nec auct. amer. L. uniflorus Mich. = L. pumilus Vahl. Pursh Fl. 1. p. 16 (?) differt à *virginica*, radice saepi tuberosa, verticillis paucifloris, calyce 5-non 4-dentate.

Terra Nova.— La Pylaie dedit Jun. 1828."

In July, 1839, after the publication of Bentham's monograph, Gay supplemented this label as follows:—

"Lycopus Virginicus β pauciflorus, *Benth.* Lab. (1832) p. 185. L. uniflorus Mich.

Radix tuberosa! dentes calycini 4, obtusi."

Thus it is quite clear that by certain European botanists our northern plant recently described as *L. communis* was early distinguished from the more southern *L. virginicus*.

The plant described by Bentham as *Lycopus macrophyllus*[1] and afterward treated by Dr. Gray as a large-leaved form[2] of *L. virginicus*, while *L. uniflorus* (*L. communis*) was treated as a diminutive form[3], was collected by Scouler on the Straits of Juan de Fuca (between Washington and Vancouver). The original material in the Hooker Herbarium is identical with the large-leaved plant collected by Lyall on the Oregon Boundary Commission near the 49th parallel of latitude (near the border of Washington and British Columbia), and another distributed by Elihu Hall as no. 395 from Oregon. These plants of Scouler, Lyall, and Hall are clearly a large-leaved phase of the common *L. uniflorus* (or *L. communis*, which by its author is said to extend west to British Columbia and Oregon). The large-leaved western plant is furthermore inseparable from New England specimens which must represent *L. membranacea* of "wet woods"; and since there is good reason to believe that this plant of the East is only a shade-phase of *L. uniflorus* or *L. communis* of "moist soil," the nomenclatorial history of the northern *Lycopus* with thick white tubers should be stated as follows:

Lycopus uniflorus, Michx. Fl. i. (1803) 14. *L. pumilus*, Vahl. Enum. i. (1804) 211; Pursh, Fl. i. 16. *L. virginicus*, authors, in part, not L. *L. virginicus, β pauciflorus*, Benth. Lab. (1833) 185

[1] Benth. l. c.

[2] "Forma procera, var. macrophyllus: *L. macrophyllus*, Benth." Gray, Proc. Am. Acad. viii. (1870) 285.

[3] "Forma depauperata: *L. uniflorus*, Michx. *L. pumilus*, Vahl." Gray. l. c.

& in D. C. Prodr. xii (1848) 177. *L. macrophyllus*, Benth. ll. cc. (1833, 1848). *L. virginicus*, var. *macrophyllus*, Gray, Proc. Am. Acad. viii. (1870) 285 & Syn. Fl. ii. pt. 1, 353. *L. communis*, Bicknell in Britton, Man. (1901) 803; Small, Fl. 1048. *L. membranacea*, Bicknell, l. c. (1901) 804.

Gray Herbarium.

ADDENDA TO THE FLORA OF VERMONT.

W. W. Eggleston (revised by E. Brainerd).

Since the publication of the Vermont Flora [1] in 1900 there has been a marked increase of interest in botanical field-work in various localities of the State, resulting in the discovery of many additional species and varieties. At the same time several of the more difficult genera of the Northeastern United States have been diligently worked over by specialists, and many old species have been divided into two, or several, or many species. Though in some cases the status of the proposed species is as yet somewhat uncertain, they have nevertheless been admitted with considerable freedom into this provisional list as plants that challenge for the time being the observation and criticism of the field botanist.

It is expected that within two years a new edition of the Vermont Flora will be published, and any further additions or corrections will be most gratefully appreciated; they may be communicated to the writer, or to the President of the Vermont Botanical Club, Ezra Brainerd of Middlebury, or to its Secretary, L. R. Jones of Burlington.

Indigenous or Well-Established Plants.[2]

Aspidium acrostichoides, Swartz, var. **incisum**, Gray. Occasional. A form of this with crisp edges also occurs: Greensboro, *Miss H. M. Hodge*; Burlington, *Mrs. F. A. Richardson*.

[1] Brainerd, Jones & Eggleston, Flora of Vermont (Contributions to the Botany of Vermont, viii). Burlington, 15 December, 1900.

[2] As in the Flora of Vermont, the names of plants indigenous in North America are printed in full face type and those of species introduced from the Old World in small capitals.

A. simulatum, Davenport. Brattleboro, *Mrs. F. B. Horton.*

A. spinulosum × marginale. (Dryopteris Pittsfordensis, Slosson, Rhodora, vi. 75.) Pittsford, *Miss Margaret Slosson.*

Asplenium ebeneum, Ait. var. **Hortonae**, Davenport, Rhodora, iii. 2, plate 22. Brattleboro, *Mrs. F. B. Horton*; Pittsford, *Miss K. A. French.*

Osmunda Claytoniana, L. var. **dubia**, A. J. Grout. An abnormal form, with pinnules separated by a distance of one-half to two-thirds their breadth, the upper ones greatly elongated and pinnately cleft. Newfane, *Grout.* (See Papers of Linn. Fern Chapter, August, 1898.)

Pteris aquilina, L. var. **pseudocaudata**, Clute. (P. latiuscula, Desv.) Manchester, *F. A. Ross*,—the only New England station.

Equisetum pratense, Ehrh. Newark, *Kennedy.*

Lycopodium clavatum, L. var. **monostachyon**, Greville & Hooker. (See Rhodora, iii. 237, and iv. 57, 100.) Westmore, *Kennedy;* Windham, Westminster, Putney, *W. H. Blanchard;* Ira, *D. S. Carpenter.*

L. complanatum, L. var. **Wibbei**, Harberer, Rhodora, vi. 102. Westmore, *Kennedy.*

Isoetes macrospora, Dur. Willoughby Lake, *Kennedy.*

I. Tuckermani, A. Br. var. **borealis**, A. A. Eaton. Grout Pond, Stratton, *Eggleston* and *Grout.*

Calamagrostis hyperborea, Lange, var. **elongata**, Kearney. Willoughby Mt., *E. & C. E. Faxon*, 1887; specimen in Gray Herb.

Lolium temulentum, L. Burlington, *Jones.*

Panicum miliaceum, L. Lumber yard, Burlington, *Brainerd.*

P. minus, Nash. Head of Lake Memphramagog, *E. Tuckerman*, 1859. (See Rhodora, iii. 105.)

P. sphaerocarpon, Ell. Railroad, Putney, *W. H. Blanchard.*

Carex aenea, Fernald, Proc. Am. Acad. xxxvii. 480 (1902). Previously confused with *C. foenea*, Willd. Cliffs and sand plains in Rutland and Addison Counties.

C. aestivalis, M. A. Curtis. Pownal, *J. R. Churchill.*

C. canescens, L. var. **disjuncta**, Fernald, l. c. 488. The common form; typical *C. canescens* has been recognized in Vermont only from Ripton.

C. canescens, var. **subloliacea**, Laestad. Cold bogs, Mt. Mansfield, *Brainerd;* Mud Pond, Wallingford, *Brainerd* and *Eggleston.*

C. Crawfordii, Fernald, l. c. 469. (C. scoparia, var. minor, Boott, in part.) Cold sterile soil; frequent.

C. Crawfordii, var. **vigens**, Fernald. Middlebury, *Brainerd;* Rutland, *Eggleston;* St. Johnsbury, *Hazen.*

C. hystricina, Muhl. var. **Dudleyi**, Bailey. Manchester, *Miss M. A. Day.*

C. intumescens, Rudge, var. **Fernaldii**, Bailey. St. Johnsbury, *Hazen;* Middlebury, *Brainerd.*

C. mirabilis, Dewey, var. **perlonga**, Fernald, l. c. 473. Little Notch, Bristol, *Brainerd.*

C. mirabilis, var. **tincta**, Fernald, l. c. 473. St. Johnsbury, *Hazen.*

C. Pennsylvanica, Lam. var. **lucorum**, Fernald, l. c. 505. Middlebury and Burlington, *Brainerd;* Pownal, *J. R. Churchill;* Fair Haven, *Eggleston.*

C. scoparia, Schkuhr, var. **moniliformis**, Tuckerm. Burlington, ***Hazen***; Knight's Island, ***Brainerd***.

C. scoparia, var. **condensa**, Fernald, l. c. 486. West Rutland, ***Eggleston***; Willoughby Lake, ***E. F. Williams***.

C. setacea, Dewey. Sudbury, ***Brainerd***.

C. straminea, Willd. var. **echinodes**, Fernald, l. c. 474. Dame Island, North Hero, ***Brainerd***.

C. umbellata, Schkuhr, var. **brevirostris**, Boott. (See Proc. Am. Acad. xxxvii. 507.) Snake Mt., ***Brainerd***.

C. varia, Muhl. Pownal, ***Eggleston***; Mallett's Head, Colchester, ***Brainerd***; Burlington, ***Pringle***.

C. vesicaria, var. **distenta**, Fries. (See RHODORA, iii. 54.) Knight's Island, ***Brainerd***.

C. vesicaria, var. **jejuna**, Fernald, RHODORA, iii. 53. Common.

C. gracillima × castanea, (?). St. Johnsbury, ***Hazen***.

[*C. scabrata × crinita*, Fernald. By an error this hybrid was credited to Vermont in Mr. Fernald's check-list of New England Carices (RHODORA, iv. 222.) The plant was from Mt. Clinton, N. H.]

Scirpus heterochaetus, Agnes Chase, RHODORA, vi. 70, plate 53, d. Lake Champlain, Milton, ***A. J. Grout***, 1893; the only station known, as yet, in New England for this new species of bulrush.

S. lineatus, Michx. Roadside in moist clay soil, Middlebury, ***Brainerd***; Bristol, *A. C. Dike*.

Arisaema Stewardsonii, Britton, Manual, p. 1045. Distinguished by its green, fluted spathe. Hartland, Pownal, Ferrisburg, ***Eggleston***.

Juncus alpinus, Vill. Willoughby Mt. and in bog near hotel, ***Eggleston***.

J. articulatus, L. var. **obtusatus**, Engelm. (See RHODORA, vi. 35.) Manchester, *Miss M. A. Day*.

J. secundus, Beauv. Twin Mts., West Rutland, ***Eggleston***.

J. tenuis, Willd. var. **Williamsii**, Fernald, RHODORA, iii. 60, plate 23. "Sandfield," Rutland, ***Eggleston***; Willoughby Lake, ***Kennedy***.

ALLIUM SCHOENOPRASUM, L. Willoughby Lake, ***Kennedy***. The plants reported in the Vermont Flora are var. ***Sibiricum***, Hartm.

Convallaria majalis, L. Thickly covering an area of about six square rods in a mucky bog, remote from dwellings, Waltham, ***Miss Ruth B. Fisher***.

Habenaria psychodes × lacera, Andrews, RHODORA, iii. 245 (cf. v. 263). Pownal, ***Andrews*** and ***White***.

Listera auriculata, Wiegand. Lyndon, ***J. W. Congdon***.

Pogonia affinis, Austin. One plant, Burlington, ***Mrs. Henry Holt***. (See RHODORA, iv. 216.)

Populus balsamifera, L. var. **candicans**, Gray. Persists about old homesteads.

SALIX ALBA, L. var. COERULEA, Koch. "Planted and spontaneous, Barre," ***Miss Eunice D. Smith***.

HUMULUS JAPONICA, Sieb. & Zucc. Waste places, Brattleboro, ***Miss Anne S. Angell***; Burlington, ***Jones***; Bellows Falls, ***W. H. Blanchard***.

Polygonella articulata, Meisn. "Roadside, Vernon road, Brattleboro, Aug. 17, 1844," *T. W. Higginson*. Specimen, now in Gray Herb., was found pressed beside the above note in Col. Higginson's copy of Bigelow's Florula Bostoniensis. Colchester Point, *Pringle*.

Polygonum aviculare, L. var. vegetum, Ledeb. (See Rhodora, iv. 70.) Frequent in rich shaded soil. This was by error listed in the Vermont Flora as *P. ramosissimum*, Michx., which name should therefore be omitted.

Rumex salicifolius, Weinm. Fort Ethan Allen, *L. B. Sprague*.

Chenopodium album, L. var. viride, Moq. Common.

Lychnis Flos-cuculi, L. Weed, roadsides and meadows, Craftsbury, *Jones*.

Silene stellata, Ait. Mr. Fernald kindly reports that this species is represented in the Michaux Herbarium at the Jardin des Plantes in Paris by a characteristic specimen labelled by Michaux, "Vermont et Nouvelle Angleterre."

Actaea neglecta, Gilman. (A. eburnea, Rydb.) Willoughby Mt., *H. H. Rusby*. This plant has been passing as white-fruited *A. spicata*, var. *rubra*, Ait. It is perhaps a hybrid of this with *A. alba*, Bigel.

Ranunculus Alleghaniensis, Britton. Smuggler's Notch, *E. F. Williams*.

R. sceleratus, L. Colchester, *Mrs. Flynn*.

Arabis brachycarpa, Britton. (See Rhodora, v. 225.) Sandy and rocky shores of Lake Champlain and vicinity. This and the following species replace *A. confinis*, Watson.

A. Drummondi, Gray. Rocky hills, western Vermont.

Sisymbrium canescens, Nutt. (Sophia brachycarpa, Rydb.) Hogback Island, Colchester, *Mrs. Flynn*.

Crataegus anomala, Sarg. Rhodora, iii. 74. Bridport, Clarendon. This and the following proposed species of this genus have been collected principally by Brainerd and Eggleston in western Vermont, and by W. H. Blanchard in Windham Co.

C. ascendens, Sarg. Rhodora, v. 141. Middlebury, Bristol, New Haven; West Rutland; Westminster, Putney.

C. asperifolia, Sarg. Rhodora, iii. 31. New Haven, Middlebury; Bellows Falls.

C. Brainerdi, Sarg. Rhodora, iii. 27. Middlebury, New Haven; West Rutland; Bellows Falls, Westminster; St. Johnsbury, *Miss I. M. Paddock*.

C. coccinea, L. Marsh Hill, Ferrisburg; Windham.

C. Champlainensis, Sarg. Rhodora, iii. 20. Frequent in the Champlain valley.

C. contigua, Sarg. Rhodora, v. 115. Stockbridge, *Eggleston*.

C. delucida, Sarg. Rhodora, v. 139. Widely distributed throughout the State.

C. demissa, Sarg. Rhodora, v. 139. Charlotte, *Horsford*.

C. dilatata, Sarg. Bot. Gaz. xxxi. 9. Frequent in the Champlain valley.

C. dissona, Sarg. Rhodora, v. 60. Near Bellows Falls.

C. Egglestoni, Sarg. Rhodora, iii. 30 One of the most common species, especially of higher altitudes up to 2300 ft.

C. exclusa, Sarg. Rhodora, v. 108. Bald Mt. Shrewsbury.

C. flabellata, Spach. (See Rhodora, iii. 75.) Bellows Falls, Westminster, Putney.

C. genialis, Sarg. Rhodora, v. 148. Common.

C. glaucophylla, Sarg. Rhodora, v. 140. Bennington, Arlington; Bellows Falls, Westminster, Putney.

C. Gravesii, Sarg. Rhodora, v. 159. Vergennes, New Haven.

C. Holmesiana, Ashe. (See Bot. Gaz. xxxi. 10.) Common.

C. intricata, Lange. Twin Mts., West Rutland; Arlington.

C. Jesupi, Sarg. Rhodora, v. 61. Twin Mts., West Rutland.

C. lobulata, Sarg. Rhodora, iii. 22. Common in Champlain valley.

C. matura, Sarg. Rhodora, iii. 24 & v. 144. Common.

C. media, Sarg. Rhodora, v. 150. Summit of Willoughby Mt., *E. Faxon.*

C. membranacea, Sarg. Rhodora, v. 186. Middlebury.

C. modesta, Sarg. Rhodora, iii. 28. Twin Mts., West Rutland; Arlington.

C. pentandra, Sarg. Rhodora, iii. 25. Common.

C. polita, Sarg. Rhodora, v. 111. Bennington, Pownal; Cornwall; Bellows Falls, Westminster.

C. praecoqua, Sarg. Rhodora, v. 167. Bellows Falls, Westminster, Putney; Lemington.

C. Pringlei, Sarg. Rhodora, iii. 21. Common.

C. punctata, Jacq. var. **aurea**, Ait. Common.

C. scabrida, Sarg. Rhodora, iii. 29. Common.

C. submollis, Sarg. Bot. Gaz. xxxi. 7. Weybridge Monument.

C. succulenta, Link. Middlebury, New Haven.

Potentilla Canadensis, L. West Rutland, *Eggleston.*

Pyrus arbutifolia, L. f. Westminster, Bellows Falls, *W. H. Blanchard.*

P. communis, L. Frequently spontaneous.

Rosa Gallica, L. Established in many places, *W. H. Blanchard.*

Rubus nigricans, Rydb. Common in the mountain towns.

R. occidentalis, L. A form with amber-colored fruit. Burlington, *L. P. Sprague*; Weathersfield, *W. H. Blanchard.*

Desmodium rotundifolium, DC. Dummerston, *L. Wild*; Bellows Falls, *W. H. Blanchard.*

Lathyrus tuberosus, L. Vergennes, *Miss Ruth B. Fisher.* (See Rhodora, iii. 230.)

Lespedeza Nuttallii, Darl. Vernon, *W. H. Blanchard.*

L. Stuvei, Nutt. Vernon, *W. H. Blanchard.*

Linum medium, Greene. Arlington, *W. H. Blanchard.*

L. sulcatum, Riddell. Pownal, *W. H. Blanchard.*

Ampelopsis quinquefolia, Michx. var. **murorum**, Rehder. Red Rocks, Burlington, *Rehder* and *Jones.*

Lechea minor, L. Vernon, *W. H. Blanchard.*

Viola cucullata, Ait. Springs, cold brooks and boggy meadows; common. (For an account of this and the following species of Viola see Rhodora, vi. 8–17.)

V. latiuscula, Greene, Pitt. v. 93. Dry sterile soil; common.

V. papilionacea, Pursh. Meadows and orchards; occasional.

V. septentrionalis, Greene. Pitt. iii. 334. Groves, hill pastures, especially under young conifers; frequent.

V. sororia, Willd. Rich open woods, moist meadows and pastures; common.

V. venustula, Greene, Pitt. iii. 335. Moist woods, and boggy meadows; frequent. (Hardly distinct from *V. affinis*, LeConte.)

Gaylussacia resinosa, Torr. & Gray, var. **glaucocarpa**, Robinson, Rhodora, ii. 83. Westminster, Pownal, *W. H. Blanchard.*

Pyrola asarifolia, Michx. Norwich, *Eggleston*; Westmore, *Kennedy.*

Vaccinium Oxycoccus, L. var. **intermedium**, Gray. (See Rhodora, iv. 237, plate 40.) Colchester, *Oakes*; Willoughby Lake, *Kennedy.*

Anagallis arvensis, L. Lawns, Bradford, *Miss A. E. Bacon.*

A. arvensis, L. var. caerulea, Ledeb. Bradford, *Miss Bacon.* (See Rhodora, iv. 185.)

Apocynum medium, Greene. Willoughby Lake, *Kennedy.*

Phlox subulata, L. Old cemeteries; St. Johnsbury, *Miss I. M. Paddock*; Putney, Stratton, *W. H. Blanchard.*

Myosotis arvensis, Lam. Sharon, *Dr. Baxter*; Townshend, *W. H. Blanchard.*

Symphytum asperrimum, Sims. Dummerston, Vernon, *W. H. Blanchard*; Stockbridge, Rutland, *Eggleston.*

Verbena angustifolia, Michx. Arlington, *W. H. Blanchard.*

V. hastata × urticifolia. Pownal, *W. H. Blanchard.*

Calamintha Acinos, L. Townshend, *W. H. Blanchard.*

Hedoma hispida, Pursh. Burlington, *F. H. Hollister.*

Lamium album. Burlington, *Mrs. Flynn.*

Lycopus uniflorus, Michx. (L. communis, Bicknell & L. membranacea, Bicknell, Britton Manual p. 803.) Wet meadows and thickets; common. (See Rhodora, vi. 134.)

Solanum rostratum, Dunal. Barre, *Miss Eunice D. Smith.*

S. Carolinense, L. Woodstock, *L. Wild*; Westminster, *W. H. Blanchard.*

Veronica Chamaedrys, L. Glebe Mt., Windham, *W. H. Blanchard.*

V. serpyllifolia, L. var. **borealis**, Laest. (See Rhodora iv. 193.) Peacham, *F. Blanchard*; Willoughby Lake, *Kennedy*; St. Johnsbury, *Miss I. M. Paddock.*

Utricularia clandestina, Nutt. Willoughby Lake, *Kennedy.*

Galium boreale, L. Burlington, *Mrs. Flynn*; Manchester, *W. H. Blanchard.*

G. sylvaticum, L. Cultivated, but also well established on a shady ledge, Orwell, *Brainerd*; Peacham, *F. Blanchard.*

Campanula uliginosa, Rydb. Britton Manual 885. Separated from *C. aparinoides*; apparently more common.

Lobelia cardinalis, L. A form with white flowers. St. Albans, *M. D. Merrick.*

Anthemis arvensis, L. Westminster, Townshend, *W. H. Blanchard.*

Aster Lindleyanus, Torr. & Gray. var. **comatus**, Fernald, n. var. "Stems and under surfaces of the midribs copiously pubescent with soft white hairs.— New Brunswick, dry woods near Four Falls, Grand Falls Par-

ish, August 14, 1901, *M. L. Fernald*; MAINE, river thicket, Fort Fairfield, September 19, 1900 — **type** — and sandy river terrace, Fort Fairfield, September 27, 1901, *M. L. Fernald*; VERMONT, Ripton, August 26, 1903, and Bellows Falls, August 24, 1903, *W. H. Blanchard*: SASKATCHAWAN, without locality, 1858, *Bourgeau*. The Vermont plants are less extreme than those from New Brunswick, Maine and Saskatchawan, but are evidently close to them."

A. longifolius, Lam. Willoughby Lake, *Kennedy*; Pownal, *Eggleston*; Connecticut valley, *W. H. Blanchard*.

A. longifolius, var. **villicaulis**, Gray. Connecticut valley, *W. H. Blanchard*.

A. paniculatus, Lam. var. **acutidens**, Burgess. Westminster, *W. H. Blanchard*.

A. paniculatus, var. **cinerascens**, Fernald, RHODORA, i. 188. Westminster, *W. H. Blanchard*.

A. paniculatus, var. **lanatus**, Fernald, RHODORA, vi. 131. Willoughby Lake, *Kennedy*.

A. paniculatus, var. **simplex**, Burgess. Westminster, *W. H. Blanchard*.

A. Schreberi, Nees. Common in southern Vermont, *W. H. Blanchard*.

A. tardiflorus, L. var. **vestitus**, Fernald, RHODORA, i. 188. Westminster, *W. H. Blanchard*.

Bidens vulgata, Greene. Previously confused with *B. frondosa*. Common.

Eupatorium perfoliatum, L. forma **purpureum**, Britton. Putney, *W. H. Blanchard*.

Hieracium Marianum, Willd. Bellows Falls, *W. H. Blanchard*.

H. PILOSELLA, L. St. Johnsbury, *Miss I. M. Paddock*.

Senecio Balsamitae, Muhl. var. **praelongus**, Greenman, RHODORA, iii. 6. Manchester, *Miss Day*.

Silphium perfoliatum, L. Burlington, *Jones*; Westminster, *W. H. Blanchard*.

Solidago juncea, Ait. var. **scabrella**, Gray. Manchester, *W. H. Blanchard*.

S. odora, Ait. Vernon, *W. H. Blanchard*. Also at Walpole, N. H.

TARAXACUM OFFICINALE, Weber, var. PALUSTRE, Blytt. (See RHODORA, iv. 155.) Rutland, *Eggleston*.

Xanthium Pennsylvanicum Wallr. (X. commune, Britton.) Bellows Falls, *Brainerd*; Burlington, *Jones*.

X. speciosum, Kearney. Burlington, *Jones*.

CASUAL PLANTS.

The following is a list of plants that have recently appeared spontaneously in cultivated fields, along railroads or near buildings. They are either garden escapes or waifs coming in mostly with foreign seed and should not, as yet, be regarded as having a proper place in our Flora.

Juncus Gerardi, Loisel. On the margin of a marshy meadow very near the railway station at New Haven Junction; perhaps from saltmarsh hay often used in packing. *Brainerd*.

ORNITHOGALUM UMBELLATUM, L. Brattleboro, *W. H. Blanchard*.

IRIS PSEUDACORUS, L. Burlington, *F. A. Ross*.

Rumex montanum, Desf. Burlington, *Mrs. Flynn.*

Silene dichotoma, Ehrh. Townshend, *W. H. Blanchard.*

Dianthus plumarius, L. Manchester, *Mrs. L. Munson.*

Delphinium Ajacis, L. Middlebury, *Brainerd;* Westminster, *Eggleston.*

Papaver intermedium, Becker. Townshend, *W. H. Blanchard.*

P. Rhoeas, L. Townshend, *W. H. Blanchard.*

Raphanus sativus, L. Hartland, *Eggleston;* Westminster, *W. H. Blanchard.*

Cicer arietinum, L. Burlington, *Mrs. Flynn.*

Vicia Faba, L. Peacham, *F. Blanchard.*

Erodium Botrys, Bertol. Gravelly bed of Winooski River below woolen mills, Burlington, *Brainerd.*

Gilia linearis, Gray. Burlington, *Mrs. Flynn.*

Ajuga reptans, L. Lawn, Burlington, *Jones.*

Sherardia arvensis, L. Introduced with seed of Eschscholtzia, Middlebury, *Brainerd.*

Ambrosia trifida, L. var. **integrifolia**, T. & G. Burlington, *Mrs. Flynn.*

Anthemis tinctoria, L. Townshend, *W. H. Blanchard.*

Artemisia gnaphalodes, Muhl. Along railroad, Bellows Falls, *W. H. Blanchard.*

Crepis setosa, Haller. Townshend, *W. H. Blanchard.*

Crepis virens, var. agrestis, Koch. Townshend, *W. H. Blanchard.*

Crepis virens, var. runcinata, Bischoff. Townshend, *W. H. Blanchard;* Stowe, *Mrs. H. E. Straw.*

Dysodia chrysanthemoides, Lag. (Boebera papposa, Rydb.) In river gravel below Winooski Falls, Burlington, *Brainerd.*

Hieracium praealtum, Vill. Burlington, *Mrs. Flynn.*

Iva xanthiifolia, Nutt. Manchester, *Mrs. L. Munson.*

Plants new to the Flora of New Bedford.— The following plants additional to those mentioned in Rhodora, vi. 22, 23, were collected by the writer in the summer of 1903: —*Heracleum Sphondylium*, L. was found on the side of a wooded lot and near the highway in the vicinity of New Bedford. If I am not mistaken, this is the first report of this European species from New England. I am indebted to Mr. M. L. Fernald for its identification. *Foeniculum vulgare*, Mill., fennel, was found near the city in waste ground, and afterwards was discovered to be cultivated quite extensively by a Portuguese farmer in the adjoining town of Dartmouth. A considerable patch of *Rubus argutus*, Link, var. *Randii*, Bailey, was also found in the latter town.— E. Williams Hervey, New Bedford, Massachusetts.

Some Maine Mosses.— In the latter part of July, 1900, Mr. E. F. Williams and the writer noticed a luxuriant growth of mosses along the course of a tiny rill which trickled down the face of a steep (apparently limestone) ledge near Frenchville, Maine. Upon close inspection it was seen that this mat consisted largely of about half a dozen species. Four of these were not recorded for the state, namely, *Distichium capillaceum*, (Swz.) Bry. Eur.,[1] *Myurella Careyana*, Sull., *Bartramia Oederi*, (Gunn.) Swz., and *Encalypta ciliata*, (Hedw.) Hoffm.

The discovery of these plants was very interesting though not surprising when we consider that they have been found in adjacent territory, eastward, northward and westward. The *Encalypta* is the plant which Prof. Kindberg calls *E. Macouni*. It is apparently well distributed in Maine. The writer has collected it in Frenchville, Township 18 of Range 10 and in New Limerick — all in Aroostook County — and in Pleasant Ridge in Somerset County. He also has specimens collected by Mr. E. D. Merrill in Auburn, Androscoggin County, nearly 250 miles from the Frenchville station. At Pleasant Ridge the plant was growing with the same associates as at Frenchville. Similar associations of the four species exist in the gorge of the Aroostook River in New Brunswick as shown by specimens collected in 1902.

Beyond the two Maine stations already mentioned for *Distichium capillaceum* this species was collected on the 1st of September, 1903, associated with *Myurella Careyana* and *Bartramia Oederi* near Moxie Falls, Somerset County. At this station it was also growing in company with *Homalia trichomitrion*, var. *Jamesii*, (Schpr.) Holz. — another moss which has not hitherto been reported from Maine. This *Homalia* was first collected by the writer on the 4th of August, 1896, in Stony Brook "Canyon," Carrying Place Plantation, Somerset County, and again on the 1st of July, 1903, at Skowhegan in the same county where it was quite abundant on two or three granite boulders in the woods.

It is a noteworthy fact that at all the stations here mentioned for *Distichium capillaceum* it has invariably been associated with *Myurella Careyana*. This social tendency is also in evidence in Europe, as shown by specimens collected by Jack in Switzerland and by Oldberg

[1] This species has recently been reported from Maine, in the "Offerings" in *The Bryologist* for January, 1904.

in Scandinavia. In the first instance the *Myurella* was *M. julacea*, (Vill.) Bry. Eur. and in the last *M. apiculata*, (Hüb.) Bry. Eur.— J. Franklin Collins, Brown University, Providence, Rhode Island.

Some Introduced Weeds of Connecticut.— In the summer of 1897 I made a visit to Central Village, Connecticut, and collected a few plants in that vicinity. Among others were three that I could not determine by the aid of any of the manuals of the flora of North America, but I had no trouble in finding them in several of the European manuals. These plants as determined by myself, and later by Mr. M. L. Fernald, were *Jasione montana*, L., *Campanula patula*, L., and *Crepis virens*, L. The field in which these plants were found had been seeded to clover the previous year. I was able to trace the clover seed to an importing house in New York City, giving me an extra clue as to how these weeds were introduced. There were but a few plants at most of either species, but I collected all that I could find. Last summer (1903) I visited the same field and found an abundance of *Jasione*, distributed nearly over the entire field. Of *Campanula* there were perhaps a dozen plants all near one another, while *Crepis* had evidently died out. At this time I found large mats of *Thymus serpyllum*, L., which had in all probability been introduced with the other weeds, but which I did not happen to see at the time that I found the others. In the same locality I have found at various times a number of other weeds that have been introduced from the West and elsewhere in grain and grass seed. Among these are *Agrostemma Githago*, L., *Echium vulgare*, L., *Silene Cucubalus*, Wibel, and *S. dichotoma*, Ehrh., *Sisymbrium altissimum*, L., *Solanum rostratum*, Dunal., *Cuscuta Epithymum*, Murr., and a number of others that I have not determined yet, one of which is probably *Berteroa incana*, DC. A number of the above have already been sent to the herbarium of the New England Botanical Club and others will be in course of time.— John L. Sheldon, West Virginia University, Morgantown, West Virginia.

James Lawrence Bennett, whose name has long been associated with the flora of Rhode Island, died at Hartford, Connecticut, April 30th, 1904. Mr. Bennett was born in Providence, April 8th, 1832. He was educated in the public schools of his native city and prepared

for Brown University, which, however, he was unable to attend. For many years he was a manufacturing jeweller, but found time for scholarly pursuits and was widely read in the natural sciences. His keen interest in botany dated back at least to his twentieth year. His botanical collecting was done chiefly in Rhode Island, but extended to the White Mountains, which he visited about ten times. He made also smaller collections in northern Vermont and in Tompkins County, New York. During 1890 and 1891 Mr. Bennett was curator of the Herbarium of Brown University, and from 1891 to 1894 the curator of the Herbarium and Museum of Economic Botany at the same institution. In 1891 he received an honorary degree of Bachelor of Arts from Brown University. In 1888 he published under the auspices of the Franklin Society his "Plants of Rhode Island, being an enumeration of plants growing without cultivation in the State of Rhode Island." This publication of 128 pages, dealing both with the flowering plants and several of the groups of cryptogams, is still the most comprehensive catalogue of Rhode Island plants. Mr. Bennett's herbarium of flowering plants has long been incorporated with the Herbarium of Brown University. It is said that his cryptogams were sold to the Brooklyn Institute.— B. L. R.

A New Sunflower for Maine.— On September 7th, 1903, Mr. F. M. Billings and I were botanizing along the water front of Bangor between the Maine Central Railroad and the wharves at City Point. A cluster of sunflower plants averaging 20 inches in height attracted our attention. Only one of these was in bloom and one had gone to seed, while the others showed no tendency to blossom. The flowering specimen was collected and submitted to Mr. M. L. Fernald of the Gray Herbarium for identification. He pronounces it to be *Helianthus maximiliani asperrimus* Gray, a plant not previously reported from the State. I am inclined to believe the seed was introduced with grain from the West.— O. W. Knight, Bangor Maine.

The Josselyn Botanical Society of Maine will hold its tenth annual meeting and field day at Fort Kent, Aroostook County, July 6th, 1904. Extremely low rates will be granted by the Maine Central and Bangor & Aroostook Railroads. The Hotel Dickey at Fort Kent

also offers greatly reduced rates. Tickets will be made good to remain two weeks and it is hoped all members will avail themselves of the opportunity thus offered to visit this wonderfully rich portion of the State. Programmes and detailed information will be sent to members, June 15th.— Dora H. Moulton, Secretary, 9 Hill Street, Portland, Maine.

Additional Notes from Willoughby.— Willoughby has its surprises even for one who has studied its Flora carefully, and in the last ten days of the present month I have collected some new plants and found stations for other rare ones and I therefore print this note.

Equisetum pratense, Ehrh. In wet pasture land, by the edge of woods, very near the Hotel. This plant as noted by Eaton (Rhodora, vi. 92) is rare in New England, having been found only in the Kennebec valley, Maine; and its occurrence at Willoughby is an interesting extension of range. Only sterile plants were found, but in considerable quantity and it may have been overlooked by summer botanists in the luxuriant growth of ferns and grasses. The rough ridges of the stem thickly set with fine spicula under a lens are so different from other New England Equiseta as to render its identification comparatively easy.

Carex deflexa, Hornem., var. **Deanei**, Bailey. On the beach at south end of the lake.

Rosa cinnamomea, L. Grows in wild abundance in pasture by an old cellar wall.

Rosa blanda, Ait., which is very smooth without prickles when growing on the slides, shows frequent spines and prickles when gathered on the Lake roadside.

Carex vaginata, Tausch, found by Pringle, and *Smilacina trifolia*, Desf., collected by Churchill, and both plants unsuccessfully sought for by other botanists, were found growing in a cedar swamp, quite near the original stations below the Four Bridges.— George G. Kennedy.

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SOME INTERESTING RHODE ISLAND BOGS.

J. Franklin Collins.

In January, 1904, the Rev. Mr. Cheney of Pascoag, Rhode Island, visited a pond several miles from his home for the double purpose of fishing through the ice and of obtaining a winter outing. During the day his botanical interest, which is always very great, overbalanced for a time his piscatorial enthusiasm and he left the fishing holes to investigate the winter remnants of plants projecting above the ice and snow on one of the so-called floating bogs in the pond. One plant having evergreen leaves with revolute margins interested and puzzled him. He took home several twigs and a few days later showed them to the writer who confirmed his suspicions that the plant was what has long passed as *Andromeda polifolia*, L. (really *A. glaucophylla*, Link) — new to the flora of Rhode Island.

On the 19th of May, Messrs. Cheney, H. W. Preston and the writer visited the locality for the purpose of obtaining flowering specimens of the plant. We could not have timed our visit better for flowering specimens as the plants were in their prime — both buds and fully open flowers being found on almost every plant. Not one of the party ever dreamed of such a sight of *Andromeda* as was there revealed, for the plants could be counted by the thousands, partially covering and fringing all the floating bogs, each with scores of the beautiful pink or white corollas and similarly colored pedicels. It is safe to say that none of the party will ever forget the sight. Mixed with, or between, the patches of *Andromeda* were hundreds of plants of *Kalmia glauca*, Ait., another plant new to the state. Here also was found *Eriophorum vaginatum*, L., a third plant unrecorded for Rhode Island. Upon the bogs grew many Black Spruces, in fact many more than all the others that the writer has seen anywhere

else in the state combined. *Arceuthobium pusillum*, Peck — a fourth plant new to the state — was found to be covering many of these trees. The party returned happy botanically although somewhat uncomfortable as the result of a persistent and penetrating rain.

The retrospective view of an excursion of this sort often reveals vistas of thought and speculation which are sometimes of considerable interest. In this particular case at least two such have been opened to the writer.

First, it is impossible to believe that this section of the state could ever have been visited by such well known sharp-eyed older Rhode Island collectors as S. T. Olney, G. Thurber, J. W. Bailey, A. L. Calder, G. Hunt and J. W. Congdon, or some of these plants would long ago have been added to the known flora of our state.

Second, the speculation as to the origin and survival of such unique plant formations is of extreme interest. The writer has not fully satisfied himself as to the origin of these characteristically northern plants at this station, but probably it is not unlike that of other plants growing in similar situations elsewhere. The conditions which maintain them are, on the other hand, apparently quite evident. All the bogs are of the floating type, though anchored by at least a few roots or stems so that they do not drift about over the surface of the pond. Beneath the film of floating vegetation there is often twelve or more feet of water, as we learned by measuring through some of the numerous and treacherous openings in the floating mass. In the winter the ice forms beneath as well as through this comparatively thin layer of loosely entangled stems and peat moss. As the warm weather approaches in the spring the ice in the open pond is readily melted; not so with that in and under the bogs. Shielded from the sun's rays by the mass of stems and moss it melts but slowly and lingers long into the spring. At the date of our visit (19th of May) the ice at the depth of eight inches or a foot below the upper surface was still, in many places, too thick for us to break even by jumping upon it. In the more exposed spots it had entirely melted and at intermediate places we succeeded in breaking it where it measured more than an inch in thickness. It will thus be seen that many of the plants, while yet in bloom, had the lower part of the stems and roots at least partially encased in ice — a truly boreal condition of affairs and one which readily accounts for such an abundance of these northern plants at this station.

Providence, Rhode Island.

PRELIMINARY LISTS OF NEW ENGLAND PLANTS,— XVII.

WALTER DEANE.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a printed record has been found.]

POLEMONIACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Gilia coronopifolia, Pers.				+		
" inconspicua, Dougl.				—		
" leucocephala, Gray				—		
" linearis, Gray	+		+			
" tricolor, Benth., var. longipedicellata, Greenman				+		
Phlox maculata, L.				—		+
" " var. candida, Gray						+
" paniculata, L.		+	+	+	+	+
" pilosa, L.						+
" reptans, Michx.			+			
" subulata, L.	+	+	+	+		+
Polemonium reptans, L.		+				
" Van-Bruntiae, Britton			+			

HYDROPHYLLACEAE.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Ellisia Nyctelea, L.				+		
Hydrophyllum appendiculatum, Michx.						—
" canadense, L.				—		—
" virginicum, L.		+	+	+		+
Phacelia brachyloba, Gray				+		
" circinata, Jacq. f.				—		
" congesta, Hook.				—		
" Purshii, Buckley					+	—
" tanacetifolia, Benth.				+		
" viscida, Torr.						—
" Whitlavia, Gray				+		

[1] Printed in RHODORA as supplementary material.

Lentibulariaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Pinguicula vulgaris, L.		+	+			
Utricularia biflora, Lam.				+	+	+
" clandestina, Nutt.	+		+	+	+	+
" cleistogama, Britton				+		
" cornuta, Michx.	+	+	+	+	+	+
" gibba, L.	+	+	+	+	+	+
" inflata, Walt.	+	+	+	+	+	+
" intermedia, Hayne	+	+	+	+	+	+
" minor, L.	+	—		+	+	+
" purpurea, Walt.	+	+		+	+	+
" resupinata, B. D. Greene	+	+	+	+	+	+
" subulata, L.				+	—	—
" vulgaris, L.	+	+	+	+	+	+

Orobanchaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Conopholis americana, Wallroth	+	+	+	+	+	+
Epiphegus virginiana, Bart.	+	+	+	+	+	+
Orobanche uniflora, L.	+	+	+	+	+	+

Martyniaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Martynia louisiana, Mill.	—			+		

Acanthaceae.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
Dianthera americana, L			+			

Notes on the above List.

Judge J. R. Churchill and I discovered *Gilia coronopifolia* in Montague, Mass., on July 24, 1887. It was scattered over a dry, sandy field and along a bank by the road, the spike-like clusters of

scarlet flowers making a beautiful display. We were assured that the plants had been established there for several years. The native home of this species is South Carolina, south and west, and it is cultivated freely in gardens, but we could not trace the source of the Montague plants.

Mrs. Nellie F. Flynn has sent me for examination a specimen of *Gilia linearis* of which she found two plants growing near the Malted Cereal Company's mills in Burlington, Vt., on July 26, 1902. (See Torreya, III, 1903, 105.) In the herbarium of the New England Botanical Club I find a specimen of this species collected by Mr. J. C. Parlin in June, 1902, in an old field in North Berwick, in the extreme southern part of Maine. The label states that the plant probably originated from wool waste. These plants were of course casual introductions, but the species may yet be found in northern New England, for it is locally abundant on sandy beaches and rocky hills of the Baie des Chaleurs between the Province of Quebec and New Brunswick, and about seventy miles from the nearest point of northern Maine.

Mr. J. A. Collins of Lawrence, Mass., has sent me for examination a specimen of Gilia which he collected on wool refuse in that city on June 14, 1900, and noted in Rhodora, III, 1901, 92, as *Gilia androsacea*, Steud. He has since presented it to the Gray Herbarium. Dr. J. M. Greenman has kindly made a thorough study of the specimen, and his report, dated May 7, 1904, is as follows :

"I have compared carefully Mr. Collins's specimen with the entire representation of this genus in the Gray Herbarium, but I am unable to identify it unqualifiedly with any species there represented ; and I am also unable to place it satisfactorily with anything recently described in this genus.

"The affinity of the plant is evidently with the Californian *G. tricolor*, Benth. and not with *G. androsacea*, Steud. A part of the original collection on which Mr. Bentham founded his *G. tricolor* is in the Gray Herbarium, and a comparison of Mr. Collins's specimen with this material shows the two plants, although differing in several regards, to be conspecific. A considerable suite of specimens representing *G. tricolor* shows, moreover, that the species is quite variable, more especially in the amount of pubescence and in the size and color of the corolla. Giving due weight to the possibility of variation, the single specimen secured by Mr. Collins seems to me to differ suffi-

ciently from the type in habit, in the mode of inflorescence, and in the calyx-characters to merit varietal rank. I therefore submit the following name and characterization:

"Gilia tricolor, Benth., var. **longipedicellata**, Greenman, n. var. Stems diffusely branched from the base, 1 to 2 dm. high, sparingly glandular-puberulent: flowers on long slender pedicels (1 to 3.5 cm. in length): tube of the calyx becoming scarious below the sinuses, but little or not at all colored: calyx-teeth lance-acuminate: corolla 7 to 10 mm. long, colored as in the species proper.— Massachusetts: on wool refuse at Lawrence, 14 June, 1900, *John A. Collins, Jr.*

"It is with some hesitation that I base this new variety upon an isolated specimen, especially as the plant was introduced evidently into the eastern locality, but I feel confident that the same form will be found sooner or later in its native country, most likely in California. Our thanks are due Prof. Willis L. Jepson for a careful comparison of Mr. Collins's specimen with the material in the Herbarium of the University of California."

The species of Phlox recorded are all escapes that have become more or less established in various localities. A few instances will suffice. Mr. M. L. Fernald found *Phlox paniculata* locally abundant in Langdon, N. H., in July, 1899, in a roadside thicket, and Mr. C. H. Bissell has shown me the species from Lyme, Conn., where he says it was well established in July, 1892. Dr. C. B. Graves collected *Phlox maculata* in June, 1891, not far from New London, Conn., where the species had been established for many years, far from any cultivated plants of the same kind. *Phlox subulata* seems to show a fondness for spreading in and about old graveyards. It was found in such a situation by Mr. E. B. Chamberlain in Cumberland, Me., on June 23, 1902, and by Messrs. L. Andrews and C. H. Bissell in Southington, Conn., in May, 1899 and 1901, as well as by Mr. E. B. Harger in Oxford, Conn., on May 13, 1901. Mr. H. E. Sargent, writing from Wolfboro, N. H., under date of December 9, 1903, says, "It is *very abundant* in some cemeteries here, and also by the roadside in some places." He has sent me a specimen collected in Alton, N. H., in 1901 by Mr. George Roberts. Mr. E. F. Williams's herbarium contains specimens of this species recently collected in Milton and Halifax, Mass., while Mr. William H. Blanchard writes me that he found this plant growing in a cemetery in Stratton, Vt., on July 7, 1903. Specimens accom-

panied his letter. *Phlox subulata* grows naturally on Staten Island, and may possibly be found in western New England.

Phlox divaricata is indigenous near Quebec and in northern and western New York and consequently should be expected in northern and western New England.

Mr. H. E. Sargent of Wolfboro, N. H., has shown me a specimen of *Polemonium reptans*, doubtless an escape from cultivation, which a pupil of his collected in that town at a distance from any garden, on May 27, 1901. This species may be found growing naturally in western New England, for it occurs in New York State.

I have in my herbarium a specimen of *Polemonium Van-Bruntiæ* collected on July 5, 1879, in Ripton, Vt., on the border of Abby Pond, 1500 feet above sea level, by President Ezra Brainerd, who recorded it in the Bulletin of the Torrey Botanical Club, VIII, 1881, 6. The range of this species as now known is limited to Vermont, New York, New Jersey and Maryland. It should be sought for in western Massachusetts and Connecticut.

Mr. W. P. Rich has given me a specimen of *Ellisia Nyctelea* collected by him in Everett, Massachusetts, on the border of the Revere Beach Parkway, on June 1, 1902. The plant was numerously represented and had been introduced in grass seed. Mr. Rich has recorded it in RHODORA, IV, 1902, 170. The species grows naturally from Virginia, south and west.

I very much doubt if there is extant a specimen of *Hydrophyllum canadense* from New England, but it certainly grows in western Massachusetts, for Mr. Ralph Hoffmann tells me that he collected it on the north slope of Greylock Mountain close to or within the limits of Williamstown on June 29, 1899. As he was not preserving plants at the time no specimens were kept. It grew "along a brookside," but Mr. Hoffmann did not see much of it. Botanists will certainly visit this locality again, and the species will surely come to light before long. Dr. Jacob Bigelow, in his Florula Bostoniensis, 2d edition, published in Boston in 1824, says, on page 73, of *H. canadense*, "Collected in the western part of the State." A little later Professor Edward Hitchcock, in his Catalogue of plants growing without cultivation in the vicinity of Amherst College, published at Amherst in 1829, says, on p. 23, "Windsor, Dr. Porter." I find other references to this species from Massachusetts, all relating, where any definite locality is given, to the Connecticut valley or

west. Reverend Chester Dewey, in his Report on the herbaceous flowering plants of Massachusetts, Cambridge, 1840, on page 187, gives as the habitat of this species, "woods and hedges; June," but leaves the locality indefinite.

Hydrophyllum canadense was reported from Connecticut nearly three quarters of a century ago in a Catalogue of the phenogamous Plants and of the Ferns, found within five miles of Yale College, by Doctors Eli Ives, William Tully, and Melines C. Leavenworth, published in the Annals of Yale College in New Haven, Connecticut, in 1831, by Ebenezer Baldwin. The reference occurs on page 282 where the name is inserted without comment. There must have been considerable botanical activity in those early days, for the authors say in the preface preceding the list: — "within five miles of Yale College, somewhat more than 1150 phenogamous plants and ferns, have already been ascertained." Recent lists give no additional information in regard to this plant; they either make very indefinite references to it or omit it altogether. It must certainly have occurred in New England when such definite localities have been recorded by botanists of distinction, and it will be most interesting to learn of the rediscovery of the species in western New England. Although it does not occur very close to the borders of New England, yet in Dr. John Torrey's Flora of the State of New York, published at Albany in 1843, we find in volume II, page 92, that it grows "In rich shady soils, northern and western parts of the State; common."

Hydrophyllum appendiculatum is reported from Connecticut in the same list mentioned above under *H. canadense.* The name occurs on the same page and is also without comment. The nearest station that I can find for this species is the flats of the Mohawk River, near Utica, New York, where the plant is rare as it is elsewhere in the State.

In the herbarium of Brown University there is a specimen of *Hydrophyllum virginicum* labelled in Mr. J. L. Bennett's handwriting, "*Hydrophyllum*, R. I. July, 1881, G. Hunt." As the label is not the original one and the locality is very indefinite, it is best to disregard the evidence furnished by the specimen. It may have been an escape, but more proof is needed that the species is native to the State.

At least twenty-five years ago Mr. C. G. Pringle found in a patch

of rich woods in Charlotte, Vt., a Hydrophyllum exhibiting characters unlike those of any known species. It grew in "a clump about a foot broad, the entire clump of uniform character and of rather dense growth." As it bore no resemblance to *H. virginicum*, Mr. Pringle says that he supposed it to be *H. canadense*, which he had never seen at that time, and he sent it out to several of his correspondents under that name. A flowering specimen deposited in the Gray Herbarium was examined by Dr. Sereno Watson, Dr. Gray being in Europe at the time, and was pronounced an undescribed species. It was not published, however, and, to quote from Mr. Pringle, who has kindly furnished me with most of my information in a letter dated November 12, 1903: "When I visited Cambridge a few years later, I asked Dr. Gray's opinion of my plant. He assured me that he had examined it critically, had found its flowers defective, sterile, and had judged it to be a monstrosity or abnormal condition of *H. Virginicum*. He charged me to watch the behavior of the plant, to see whether it ever produced seeds. . . . . I had my plant marked and was wont to return to it year by year, sometimes taking off more specimens. There was no confusing it with *H. Virginicum*, as it was growing isolated. Though I revisited it during several years, I never found its flowers bearing seed. And more, the last time I saw it, some of the rhizomes which composed the clump were showing normal *H. Virginicum* leaves. I felt positively sure that the plant was recovering its normal *Virginicum* type. There was no chance for mistake about it. After I had been away from home on several annual journeys, I looked again one summer for the plant; but no trace of it was to be found. The young trees, which had sprung up around it, had become so dense as to choke it out."

I have examined two specimens of this remarkable plant, one kindly loaned me by Prof. L. R. Jones from the Herbarium of the University of Vermont, collected on June 2, 1878, and one in the Gray Herbarium, collected on June 6, 1879. The two specimens are identical. If the plant is an instance of teratology, it certainly retains absolutely no characters of whatever species it is allied to, with the exception of the production, on one occasion, of *virginicum* leaves, which Mr. Pringle unfortunately did not preserve. A fact tending to prove its abnormality is the absence of ovules which careful microscopic examination in which I was assisted by Dr. B. L.

Robinson and Dr. J. M. Greenman failed to discover. Dr. Watson, as I stated before, at first believed it to be a new species, and he went so far as to attach a specific name to it on the sheet. He was, however, evidently persuaded by Dr. Gray to abandon that position, for he never published it. Whatever the plant may be, its extraordinary appearance, so totally unlike that of *virginicum* or *canadense*, or, in fact, of any species of Hydrophyllum, and the fact that it preserved its characters for so many years, seem to render it advisable to put the plant on record as follows:

Hydrophyllum sp. ? Branching perennial, 4 dm. high: rhizome nodulose, horizontal or oblique: stem branching from near the base, erect, striate, strigillose-pubescent, the short white very acute hairs appressed or more often retrorse: leaves alternate, thin; the blade ovate, coarsely and pinnately about 9-toothed or parted, 6 to 8 cm. long, 4 to 6 cm. broad, pinnately nerved; the teeth or lobes ovate to elliptic-oblong, obtuse or obtusish, mucronate; the sinuses acute or narrowly rounded, above sparsely strigillose, dark green, beneath paler and strigillose; lower petioles very long, 11 to 20 cm. in length, the upper 1.5 to 3.5 cm. long: cymes round-topped, 2.5 cm. broad, raised on slender, strigillose peduncles 2 to 7.5 cm. long; pedicels in anthesis 3 mm. long: calyx deeply 5-parted; lobes linear, acute, 3-nerved, strigillose on the outer surface, hispid-ciliate chiefly near the tip, 3.5 mm. long, 0.8 mm. broad: corolla funnel-formed, 5-parted to the middle, 6 mm. long, probably white; lobes oblong, rounded at the apex; internal folds 2.5 mm. long; filaments 8 mm. long, glabrous; anthers oblong, mucronate: style filiform, glabrous, 1 cm. long, shortly 2-cleft; stigmas capitate; ovary hairy, 1-celled, containing the two large involute placentæ characteristic of the genus, but so far as can be determined entirely devoid of ovules.

The Phacelias listed are waifs growing on flats, in wool-waste and similar places, and have a general interest attaching to introduced plants.

In the Flora of Mount Desert Island, Maine, published by Messrs. Rand and Redfield in 1894, the late Dr. Thomas Morong comments, on page 135, on a peculiar form of *Utricularia gibba* as follows: "The flower has the spurs of *U. biflora* very decidedly, but the foliage and the bladders are those of *U. gibba*. The spur here is oblong, narrow, not curved but projecting straightwise, and the perianth is somewhat larger than is generally the case in *U. gibba*. Other specimens with foliage and bladders better represented might show this to be *U. biflora*, but at present it is safer to call it '*U. gibba* verging towards *U. biflora* in flowers.'" The letter containing the above

remarks was written to me, and I have the very specimens that were examined, for they were returned to me with the letter. They were collected at Somes Pond by Mr. E. L. Rand, who sent them to me. I have other specimens of the same collecting besides abundant typical material from elsewhere. Comparison of all these specimens shows that the points of difference between the Somes Pond form and typical plants lie in the size of the flowers and in the longer narrow spur. Dr. Morong says that the spur is "not curved," but a slight curve does occur in specimens that were not submitted to him. In the Gray Herbarium are specimens collected in South Kingston, R. I., by Olney and Thurber in 1846, resembling in size of flowers and shape of spur the forms submitted to Dr. Morong. These points alone do not seem to warrant regarding the plants as more than a form of *gibba*, and it is much better to follow Dr. Morong's critical judgment as expressed above.

In the Bulletin of the Torrey Botanical Club, III, 1872, 56, Mr. Elihu S. Miller reports finding *Utricularia fibrosa*, Walt. (*U. striata*, Le Conte) at Wading River, in the northern part of Long Island. As the width of Long Island Sound only separates this station from Connecticut, the species should be looked for in the southern part of that State.

The latest published record crediting *Utricularia purpurea* to Vermont, and embodying the results of all previous study of the flora of that State, is found in the Flora of Vermont by Brainerd, Jones and Eggleston, published in 1900, where stations for that species are given on the authority of the late Dr. F. Blanchard of Peacham, Vt. In my search for herbarium specimens of this species from that State I have been kindly aided by the three authors of the above-mentioned Flora, but every effort has failed to disclose the plant. Dr. Blanchard was a copious collector in Vermont and many herbaria contain specimens of his work. These herbaria I have traced and examined with the greatest care, but without result. *Utricularia purpurea* from Vermont has failed to appear. Mr. Eggleston wrote me in December, 1903, that Mrs. Alice F. Stevens of Washington, D. C., had written him in 1895 that in her herbarium, among Dr. Blanchard's plants, of which she had purchased a large number, was *U. purpurea* from East Barnet and West Danville, Vt. Mr. Eggleston, however, did not see the specimens. Mrs. Stevens writes me that she cannot recall the circumstance and that a careful

search in her herbarium does not reveal the plants, but that a few years ago, alarmed at the dampness in the room where they were stored, she examined them and destroyed quite a number, among which might possibly have been the much desired species. She has sent me one of Br. Blanchard's Utricularias marked "*U. purpurea?*" but no other data accompanies the sheet, so that it is only presumably from Vermont, while the specimen is not *purpurea* but *intermedia.* Of course I do not think that there is the very slightest doubt that the species occurs in Vermont, for it is found in all the other New England States, specimens from which I have seen, but under the circumstances I do not feel justified in crediting it to the State. It will doubtless turn up during the coming summer in one or more of the many ponds or streams that are scattered over Vermont.

Utricularia subulata reaches its northern limit, as far as I can discover, in southern New England, where I know it to occur only at Worden's Pond, South Kingston, R. I. (Plants of Rhode Island, J. L. Bennett, 1888, 28); Nantucket, Mass., where I have collected it at Tom Never's Pond and Gibb's Pond; and "within five miles of Yale College," New Haven, Conn. (Annals of Yale College in New Haven, Conn., E. Baldwin, 1831, 300). This is in the list of plants referred to above under *Hydrophyllum canadense.*

U. cleistogama has been reported only from Nantucket and Cape Cod, Mass., and appears to reach its northern limit here. They are both coastal species.

I have been unable to find even a published record of the occurrence of *Utricularia clandestina* from New Hampshire or of *U. minor* from Vermont, but there is no reason why these species should not grow in these States, as they are so generally distributed over the rest of New England.

In the Herbarium of the New England Botanical Club is a specimen of *Martynia louisiana* labelled "Boston, 1877. C. E. Perkins." This very transient stranger was probably collected on South Boston flats. Prof. George L. Goodale in his Catalogue of the flowering plants of Maine, published in the Proceedings of the Portland Society of Natural History, I, 1862, 56, says of this species: "occurs in Portland around wharves of Cuban traders."

Prof. L. R. Jones of the University of Vermont, Burlington, Vt., has been kind enough to send me from the herbarium for examination the classic sheet of *Dianthera americana* collected in

the first quarter of the last century, about 1819, in Ferrisburg, Vermont, by Dr. William Paddock, and representing the only known specimen from the only known station in New England. Dr. Paddock was Professor of Botany and Materia Medica in the Medical Department of the University of Vermont from 1821 to 1824. Prof. Jones in a letter to me writes that he has learned from Prof. G. H. Perkins that all of Dr. Paddock's collections (of which there was quite a package in the herbarium when it came into Prof. Perkins's charge) were made about 1819.

Owing to the rarity as well as antiquity of the specimen, a description of it may not be amiss. The original sheet measures twelve by seven inches and contains a small specimen about five inches long, of six leaves and two heads or spikes, one in bud and one in flower. Below this are three separate leaves and one spike in flower with its long peduncle. These fragments are all glued to the sheet. Two labels pasted on the sheet and written in black ink read: — "*Justicia pedunculata*" and "26 Sept. Ferrisburgh Vt." This sheet is pasted on to a larger one, sixteen by ten inches in dimensions and contains the following inscription in red ink in the corner:— "*Justicia Americana*, Vahl. Dr. Paddock's specimen. *Dianthera Americana*, L." In a letter accompanying the sheet Prof. Jones tells me that the words "*Justicia Americana*, Vahl. Dr. Paddock's specimen" are in the handwriting of Prof. Joseph Torrey, who was connected with the University as Professor and President from 1827 to 1867. This is a good voucher for the authenticity of the specimen. Prof. Perkins says that the plant can be no other than the one collected by Dr. Paddock. Definite reference to this specimen is made by William Oakes on page 194 of his Botany of Vermont, published in Thompson's History of Vermont in 1842, where it is also stated that it was seen by Dr. J. W. Robbins.

Dianthera americana is recorded from near Montreal, from Staten Island and through central New York, and should be looked for in the western parts of Vermont, Massachusetts and Connecticut. It is hoped that the old and interesting record now remaining as the sole one from New England will soon be broken.

CAMBRIDGE, MASSACHUSETTS.

THE GREEN ALDERS OF NEW ENGLAND.

M. L. Fernald.

Alnus viridis, DC. (*A. Alnobetula*, K. Koch) is the type of a subgenus which is represented in alpine or cool situations in nearly all parts of the northern hemisphere. The European shrub, *A. viridis*, a species of mountain districts, has glabrous twigs, thinnish but finally firm leaves which are glabrate and pale beneath and in maturity 3 to 6 cm. long, the mature fertile aments 0.8 to 1.3 cm. long, 5 to 9 mm. thick. In northeastern America it is represented by two shrubs, both of which have been generally referred to it.

A. crispa, Pursh, Fl. 623 (1814). *Betula crispa*, Aiton, Hort. Kew. iii. 339 (1789). This is the nearest ally of *A. viridis* in America, but differs from the European shrub in its much firmer thick leaves which are more rugose and with greener under surfaces. It occurs from Labrador and Hudson Bay south to the Alpine summits of Mts. Katahdin, Washington, Mansfield, and Whiteface (New York). For the identification of our alpine shrub I am indebted to Mr. Edmund G. Baker of the British Museum of Natural History, who has obligingly compared material of this and of the following shrub with the original of Aiton's *Betula crispa* which proves to be essentially like the firm-leaved glabrate shrub of Mt. Katahdin.

A. mollis, n. sp. Young branches and peduncles pubescent: mature leaves 4.5 to 10 cm. long, closely serrate with sharp unequal teeth, and permanently covered beneath with a soft short plush-like pubescence: mature fertile aments 1.2 to 2 cm. long, 0.9 to 1.2 cm. thick.— Cold bogs, swamps, exposed rocky banks, etc., Newfoundland to Lake Winnipeg, south to southern Maine and New Hampshire, western Massachusetts, New York and Lake Superior. Specimens examined: —

Newfoundland, near Topsail, Conception Bay, August, 1901 (*Howe & Lang*, no. 1342); St. John's, August 1, 1894 (*Robinson & Schrenk*, no. 24): New Brunswick, Kent County, 1870 (*Fowler*): Nova Scotia, Point Pleasant, June 18, 1884 (*Macoun*); Pictou, July, 1901, Digby, July, 1901, Yarmouth, June, 1901 (*Howe & Lang*, nos. 552, 273, 46): Maine, St. Francis, Aug. 17, 1893 — no. 98, Ashland, June 13, 1898 — no. 2445, Island Falls, Aug. 26, 1897, Blanchard, Sept. 4, 1897, Orono, May 24 and Aug. 18, 1890, Cutler, July 1, 1902, Southport, Aug. 1, 1894 (*M. L. Fernald*); Dover, May and July 1, 1896 (*G. B. Fernald*, nos. 5, 45, 62, 65); Manchester (*Scribner*); Northport (*Furbish*): New Hampshire, White

Mountains (*Tuckerman*); Crawford Notch, 1888 (*Swan*); Oakes Gulf, Mt. Washington, alt. 4500 ft., June 29, 1898 (*Williams*); Ammonusuc River, September, 1842 (*A. Gray*): VERMONT, Brookline June 30, 1895 (*Grout*): MASSACHUSETTS, Buckland, July 26, 1903 (*F. F. Forbes*): ONTARIO, Nepigon, September, 1896 (*G. S. Miller*); near Sault Ste. Marie, 1848 (*Loring*); Silver Islet, August. 1871 (*Gillman*): MANITOBA, Lake Winnipeg, 1857 (*Bourgeau*).— Occasional specimens from alpine situations have the small fertile aments of *A. crispa*, but ordinarily this shrub of temperate areas is very constant in its characters and is quite unlike any Old World shrubs of the *viridis* group known to the writer.

GRAY HERBARIUM.

AN INTERESTING SPECIMEN OF ARISÆMA TRIPHYLLUM, TORR., the common "Jack-in-the-Pulpit," was recently brought to me by a schoolboy. It showed a peculiar malformation, the inflorescence being made up of two spathes and three spadices. The spathes were each

perfectly formed and were connected at the base where one overlapped and enclosed the other; but the spadices were each much wider throughout than is normal, and they were also deeply grooved and ridged lengthwise, and united at the base where the spathes scarcely clasped around them.

Whether or not the plant showed any other tendency to abnormal growth I am unable to say, for the "flower," snapped off boy fashion, is all that I have been able to procure. Probably some readers of RHODORA have seen monstrous growths of *Arisæma triphyllum* in which there have been two spathes with one spadix, as noted by Prof. W. W. Bailey, Bot. Gaz. ix, 177, or vice versa, but I doubt if anyone has before come across a specimen showing so much divergence from the normal form as is found here in the specimen illustrated. — ALICE G. CLARK, East Weymouth, Massachusetts.

A New Station for Nyssa sylvatica in Maine. — In Dame and Brooks' Handbook of the Trees of New England, p. 159, the only locality in Maine given for *Nyssa sylvatica*, Marsh., is "Waterville on the Kennebec." I have in my collection a specimen, brought me by Walter Emery of Wells Depot, which he collected in the town of Newfield, York Co. — J. C. Parlin, North Berwick, Maine.

Notice of Annual Field Meeting of the Vermont Botanical Club. — The tenth annual field meeting of the Vermont Botanical Club will be held at Silver Lake and at Lake Dunmore, Addison Co., on Tuesday and Wednesday, July 12 and 13, 1904. This will be a joint gathering with the Vermont Bird Club, following the successful practice of the last two summers.

The members of the Club are expected to meet at "The Inn" Brandon, on Tuesday, by trains arriving from the south at 10.54 a. m. or 2.40 p. m., and from the north at 10.15 a. m. or 2 p. m. After dinner conveyances will start for Silver Lake, along a mountain road, where there is much of botanical interest. Fare 35 to 50 cents. Supper, lodging and breakfast will be had at the Silver Lake House for one dollar each. On Wednesday excursions will be formed for the ascent of Rattlesnake Point on Moosalamoo Mt., or for trips by rowboats or steamer to points of interest along the lake.

Dinner and supper may be had at the Lake Dunmore House at special rates. Members of the party may return that evening or on the following day, and either by Brandon or by Middlebury, as they may decide after getting on the ground.

It is important that hotel and livery proprietors should know in advance just what numbers they are to provide for; and the members of the Clubs who expect to attend the meeting are requested to send in their names to President Brainerd of Middlebury at least one week in advance of the gathering.

Ezra Brainerd,
M. D. Chittenden,
Miss Carrie W. Ormsbee,
Committee on Field Meeting.

Middlebury, Vt., June 8, 1904.

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NOTES ON NEW ENGLAND HEPATICAE, — II.

ALEXANDER W. EVANS.

(Plate 57.)

IN the first paper of this series[1] attention was called to fourteen species of Hepaticae which were of interest either because they were new to New England or because they were imperfectly described in American literature. The present paper is a continuation along the same lines. With the exception of *Scapania convexula* and the new *Lepidozia* all of the species noted are common to Europe. The arrangement followed is again that of Schiffner in Engler and Prantl's "Die Natürlichen Pflanzenfamilien."

1. PALLAVICINIA FLOTOWIANA (Nees) Lindb. Musc. Scand. 10. 1879. *Cordaea Flotowiana* Nees, Flora, **16**: 405. 1833. *Diplolaena Lyellii*, var. *Flotowiana* Nees, Naturgeschichte der europ. Lebermoose, **3**: 344. 1838. *Blyttia Lyellii*, var. *Flotowiana* G. L. & N. Syn. Hep. 475. 1846. *Moerckia hibernica*, var. *Wilsoniana* Gottsche; Rabenhorst, Hep. Europ. *121* (note). 1860. *Pallavicinia hibernica*, vars. *Wilsoniana* and *leptodesma* Pears. Hep. Brit. Isles, 435, 436. *pl. 193*. 1901. *Moerckia Flotowiana* Schiffn. Oesterr. Bot. Zeitschr. **51**: 41. 1901. A very few plants of this interesting species were found last September by A. LeRoy Andrews on Mt. Greylock, Massachusetts; they were growing on a wet bank in the "Notch."[2] Until recently most botanists have considered the species a variety or even a mere form of *P. hibernica*, and no allusion to it what-

[1] RHODORA, **4**: 207–213. 1902.

[2] Mr. Andrews has already noted his discovery in RHODORA, **6**: 75. 1904.

ever is made by Stephani in his Species Hepaticarum (1900). The studies of Warnstorf,[1] however, show conclusively that the plant is worthy of specific rank, and it is now recognized as a distinct species by Schiffner and by several other European hepaticologists. Many years ago Nees von Esenbeck[2] referred to *P. Flotowiana* a specimen from Newfoundland, in the Montagne herbarium. This is apparently the only reference to the species as an American plant, and even this must be considered doubtful since the Newfoundland specimen is not mentioned in any subsequent writings. The species, however, was collected several years ago at Yakutat, Alaska, by Coville and Kearney and has been listed and described by the writer under the name of *P. hibernica*.[3] The latter species has also been recorded from Nebraska, Ontario and British Columbia,[4] and it is of course possible that some of these reports are based on *P. Flotowiana* instead of on the true *P. hibernica*. The two species are separated from each other by purely vegetative characters: *P. hibernica* is less robust than *P. Flotowiana*, the midrib of the thallus is thinner and passes more abruptly into the delicate marginal wing, and the latter is never crispate but is plane or nearly so. In robust forms of *P. Flotowiana*, Tansley and Chick[5] have demonstrated the presence in the midrib of two slender strands of slightly elongated cells with lignified walls, and Pearson's var. *leptodesma* is based on a peculiarity of this sort. Cavers[6] has shown that these strands play an important part in the conduction of water, just as the single strand does in *P. Lyellii*, but he has also shown that they fail to develop in plants cultivated under very moist conditions. It would appear from this that the presence or absence of the strands is not of very great importance from the standpoint of the taxonomist and that it should hardly be used as a differential character in separating *Moerckia* generically from *Pallavicinia*. *P. Flotowiana* is perhaps the most noteworthy of the recent additions to the hepatic flora of New England.

[1] Allgem. Bot. Zeitschr. 1899: 15. Kryptogamenfl. der Mark Brandenburg, **1**: 99. 1902.

[2] Naturgeschichte der europ. Lebermoose, **3**: 346. 1838.

[3] Proc. Wash. Acad. **2**: 291. 1900.

[4] Webber, Cat. Flora Nebraska, 93. 1890; Macoun, Cat. Canadian Plants, **7**: 8. 1902.

[5] Ann. Bot. **15**: 7. *pl. 1, f. 1.* 1901.

[6] The Naturalist, 1903: 451.

2. MARSUPELLA AQUATICA (Nees) Schiffn. Lotos, **44**: 267. 1896. *J. emarginata*, var. *aquatica* Lindenb. Nova Acta Acad. Caes. Leop.-Carol. **14**, suppl.: 75. 1829 (not *Jungermannia aquatica* Schrank, 1789).[1] *Sarcoscyphus Ehrharti*, var. *aquaticus* Nees, Naturgeschichte der europ. Lebermoose, **1**: 125. 1833. *J. emarginata*, var. *grandis* Hüben. Hep. Germ. 124. 1834. *S. Ehrharti*, var. *robustus* DeNot. Comm. Soc. Critt. Ital. **1**: 80. *f. 4.* 1861. *Nardia emarginata*, vars. *major* and *aquatica* Carr. Brit. Hep. 14. 1874. *M. emarginata*, var. *aquatica* Dumort. Hep. Eur. 126. 1874. *N. robusta* Trevis. Mem. R. Ist. Lomb. III. **4**: 400. 1877. *N. emarginata*, var. *aquatica* Massal. & Carest. Nuovo Gior. Bot. Ital. **12**: 312. 1880. *S. aquaticus* Breidl. Mitth. d. Naturw. Ver. f. Steiermark, **30**: 286. 1894. Mt. Katahdin, Maine (*Cowles Party*); White Mountains, New Hampshire (*Oakes*).

3. MARSUPELLA MEDIA (Gottsche) Schiffn. Lotos, **49**: 49. 1901 (as synonym). *Sarcoscyphus sphacelatus*, var. *medius* Gottsche; Rabenhorst, Hep. Europ. *137.* 1860 (in part). *S. Sullivanti* DeNot. Comm. Soc. Critt. Ital. **1**: 84. *f. 6.* 1861.[2] *S. Ehrharti*, var. *erythrorhizus* Limpr.; Cohn, Kryptogamenfl. von Schlesien, **1**: 248. 1876. *S. sphacelatus*, var. *erythrorhizus* Limpr. *l. c.* 432. *Nardia sphacelata*, var. *media* Massal. Ann. dell. Ist. Bot. di Roma, **2**: (9). 1886. *M. sphacelata*, var. *erythrorhiza* Schiffn. Lotos, **44**: 267. 1896. *M. erythrorhiza* Schiffn. *l. c.* **49**: 48. 1901. Streaked Mountain, Hebron, Maine (*J. A. Allen*); Mt. Washington, New Hampshire (*L. M. Underwood*); Magnolia, Massachusetts (*W. G. Farlow*); Mt. Carmel and Beacon Falls, Connecticut (*A. W. E.*).

Only two dioicous species of *Marsupella*, *M. emarginata* and *M. sphacelata*, have been recognized by American students as occurring in eastern North America. These two species, which have a wide distribution in northern regions, have recently been studied by Professor Schiffner, of Vienna, one of the most careful students of the Hepaticae, and the conclusion is reached that both species, as ordinarily understood, are aggregates. What he considers the typical *M. emarginata* grows in moist rather than wet localities and is some-

[1] The synonym "*Jungermannia aquatica*" for this species is sometimes attributed to Schrader, with the citation "Spic. Fl. Germ. 75. 1794." This, however, is an error, because Schrader, although describing the plant in the place quoted, does not give it a formal name.

[2] Based on Musc. Alleg. *216* (distributed as *Sarcoscyphus Ehrharti.*)

times completely dried up in the summer; from this he would separate as a distinct species the submerged *M. aquatica*. The typical *M. sphacelata*, on the other hand, is a submerged aquatic, and from this he would separate *M. erythrorhiza*, which grows in drier localities. *M. aquatica* and *M. erythrorhiza* were both clearly described many years ago by Limpricht, who treated them as varieties only, but implied at the same time that their characters were fully as marked as those separating the typical forms of *M. emarginata* and *M. sphacelata*. The validity of *M. aquatica* as a species was recognized by Lindberg, Massalongo, Stephani and others, and there is now a tendency among European writers to recognize *M. erythrorhiza* also. The choice of a name for this second species is not an easy matter. The oldest synonym is the one first quoted, but Schiffner discards the name *media*, provisionally at least, because *No. 137* of the Hep. Europ. is a mixture of two species. If we follow him in this course we should choose the name *Sullivanti* of DeNotaris rather than the later name *erythrorhiza* of Limpricht. The synonymy of the species is already very complicated and in order to avoid increasing it still further the name *M. media* is here retained.

The characters separating *M. aquatica* and *M. media* from the two species to which they are respectively allied are drawn almost entirely from the vegetative organs; they concern the structure of the stem, the shape of the leaves and the peculiarities of the leaf-cells. Most of these characters are relative, and although extreme forms of both species are easily distinguished, other forms are sometimes met with which are difficult to refer definitely. As, however, other species, such as *Lophozia lycopodioides* and *L. Floerkii*, are recognized, between which connecting links actually occur, there seems to be no great objection to following this policy in the case of *M. aquatica* and *M. media*. Even if they are not yet wholly permanent, they are assuredly species in the process of evolution.

M. aquatica is a very robust plant and sometimes reaches a length of a decimeter or more. The stems are sparingly branched and very firm in consistency. In a cross-section the cells all appear of about the same size and are polygonal in outline. Those in the middle are thin-walled but pass gradually into the thick-walled cells of the outer portion. The outermost layer is composed of shorter cells than those in the interior but they are usually thick-walled also; sometimes, however, close to the base of a leaf, the walls of this

layer are distinctly thinner. The stiff leaves spread widely from the stem, so that even when close together they do not present the appearance of being crowded. They are strongly complicate and are bifid about one-eighth with a short and blunt apical sinus and broad and rounded lobes. The leaf-cells are usually distinctly thickened throughout and have conspicuous trigones. The true *M. emarginata* is a smaller plant with shorter and more delicate stems, although the latter are essentially the same in structure. The leaves, which spread more obliquely from the stem, are more obtusely complicate and more deeply lobed, the lobes being sometimes blunt but usually obtusely pointed. The walls of the leaf-cells are less strongly thickened although still provided with conspicuous trigones. With respect to color *M. emarginata* varies from bright green to reddish. *M. aquatica* also varies considerably but is usually of a duller hue; sometimes it glistens as if varnished. Neither species ever exhibits the deep purplish black color which is so often to be seen in *M. media*. *M. aquatica* is apparently confined to alpine or subalpine regions while *M. emarginata* descends into the plains.

M. sphacelata attains its most characteristic development in the boggy pools and sluggish brooks of subalpine regions. The following are the only New England stations to be cited at present with certainty: Mt. Washington, New Hampshire (*D. C. Eaton, W. G. Farlow, A. W. E.*); Mt. Mansfield, Vermont (*D. C. Eaton, A. W. E.*). The records for Maine and Connecticut, therefore, in the writer's Preliminary List of New England Hepaticae[1] should be revised. The species grows in broad thick tufts of a dull green color often tinged with blackish and is much less firm in consistency than the two plants just considered. In cross-section the stem shows a distinct border of large thin-walled cells; just within this the cells have slightly thickened walls but pass gradually into the thin-walled cells of the interior. The leaves are divided by a narrow sinus into two broad and rounded lobes; they are very delicate in texture, and yet their cells, although thin-walled, show small but distinct trigones. *M. media* is found not only in the mountains but also in the plains, and its range extends as far south as Georgia. It is a much firmer plant than *M. sphacelata* and is usually much more richly colored; a deep purplish black is perhaps the most character-

[1] RHODORA, 5: 170-173. 1903.

istic hue, but in shaded localities the color tends to be much paler. The cross-section of the stem, as in *M. sphacelata*, shows a distinct border of thin-walled cells, but this is often broken down and indefinite in weathered specimens; the cells just within this layer are very thick-walled but grade into the thin-walled cells of the interior. The leaves are more deeply divided than in *M. sphacelata*, and their divisions, although commonly rounded, are sometimes obtusely pointed; the leaf-cells have slightly thickened walls and distinct trigones but are more delicate than in *M. emarginata*. The reddish rhizoids, which account for Limpricht's varietal name, may usually be detected on the stems and branches themselves, especially near the base, as well as on the stolons. They are not confined to *M. media* but may also be found in *M. emarginata* and *M. sphacelata*, where, however, they are scanty and developed only on the stolons. Even in *M. media* these rhizoids are sometimes very few in number and bleached out until they are almost colorless, so that they do not always constitute a reliable character.

4. Jungermannia cordifolia Hook. Brit. Jung. *pl. 32*. 1816. *Aplozia cordifolia* Dumort. Hep. Eur. 61. 1874. *Solenostoma cordifolium* Steph. Bull. de l'Herb. Boissier, II. 1: 499. 1901. Many years ago Russell[1] doubtfully referred to *J. cordifolia* a sterile hepatic which he had collected in bogs at Plymouth, Massachusetts. He described his specimens as being "furnished with capitula and with white pulverulent granules," so that he evidently had a gemmiparous plant before him. His determination, therefore, was probably incorrect as the gemmae of *J. cordifolia* are unknown. A second New England record, from Oakes Gulf in the White Mountains,[2] has also been proved erroneous, the specimens in question being referable to *Nardia obovata*.[3] The true *J. cordifolia*, however, was discovered by Miss Annie Lorenz and the writer at Rainbow, Connecticut, during the June meeting of the Connecticut Botanical Society in 1903; it may therefore be looked upon as an addition to the New England flora and also to that of the eastern United States. The species is already known from Cape Breton and from other parts of Canada and is abundant from the Rocky Mountains westward. The Rainbow specimens grew on wet and gently sloping rocks on the banks

[1] Boston Jour. Nat. Hist. 3: 466. 1845. [2] Hep. Amer. *113*.

[3] Evans, Proc. Wash. Acad. 2: 298. 1900.

of the Farmington River, and the majority of them were partially covered with sand. It is probably on this account that they are less robust than is usual in the species and that their leaves are less concave and more frequently spreading. In these respects the specimens resemble large forms of *J. riparia* Tayl. (particularly the var. *potamophila* Bernet [1]) a species known in America from British Columbia only. In *J. cordifolia*, however, the walls of the leaf-cells although thin are firm and usually more or less pigmented with purplish red, while in *J. riparia* the cell-structure is more delicate and the walls are colorless. The cells of *J. cordifolia*, moreover, are wholly destitute of trigones, while in *J. riparia* minute but distinct trigones may almost always be demonstrated. The cuticle of *J. cordifolia*, finally, is distinctly striate-verruculose, especially toward the bases of the leaves, while in the other species it is perfectly smooth. According to Pearson[2] the absence of rootlets and of flagella is a constant peculiarity of *J. cordifolia*, both being abundantly produced by *J. riparia*. This difference cannot be relied upon; the fertile specimens of *J. cordifolia* distributed by Schiffner in his Hep. Europ. Exsic. *78*, show both rootlets and flagella, and the same is true of the Rainbow specimens.

5. Sphenolobus exsectaeformis (Breidl.) Steph. Bull. de l'Herb. Boissier, II. **2**: 178. 1902. *Jungermannia exsectaeformis* Breidl. Mitth. d. Naturw. Ver. f. Steiermark, **30**: 321. 1894. *Diplophyllum exsectiforme* Warnst. Kryptogamenfl. der Mark Brandenburg, **1**: 161. 1902. Mt. Desert, Maine (*W. G. Farlow*); Randolph, New Hampshire (*W. G. Farlow*); Laconia, New Hampshire (*Mrs. Carter*); Jericho, Vermont (*A. W. E.*).

6. Sphenolobus exsectus (Schmid.) Steph. Bull. de l'Herb. Boissier, II. **2**: 178. 1902. *Jungermannia exsecta* Schmid. Ic. Plant. Ed. II. 241. *pl. 62, f. 2, p. p.* 1797. *Lophozia exsecta* Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Scapania exsecta* Aust. Hep. Bor.-Amer. *21*. 1873. *Diplophyllum exsectum* Warnst. Kryptogamenfl. der Mark Brandenburg, **1**: 160. 1902. Shelburne and Glen Ellis, New Hampshire (*W. G. Farlow*); Willoughby, Vermont (*Miss Lorenz*); Branford, Connecticut (*A. W. E.*).

The two species just noted are very closely allied, and it is only

[1] Cat. des Hép. du Sud-Ouest de la Suisse, etc. 58. *pl. 1, f. 1.* 1888.

[2] Hep. Brit. Isles, 291. 1901.

within recent years that they have been clearly distinguished. Both species produce an abundance of gemmae but are exceedingly rare in fruit. The characters which separate them are derived from the leaf-cells and the gemmae. In *S. exsectaeformis* the median cells average 22 × 36 μ, and their thin walls show distinct trigones; in *S. exsectus* the cells in the same position average 9 × 18 μ, and their walls are more uniformly thickened, the trigones being inconspicuous. The gemmae of *S. exsectaeformis* are angular, while those of the other species are ellipsoidal or ovoid. Both species are widely distributed in Europe, and an interesting account of them may be found in a recent paper by M. G. Dismier, of Saint-Maur, France.[1] Under his *Scapania exsecta*, Austin quotes as a synonym the *Jungermannia scitula* of Taylor; the type-specimen of this species, however, shows that it is abundantly distinct. Stephani also recognizes its validity and describes it as *Sphenolobus scitulus* (Tayl.) Steph.

7. Sphenolobus Hellerianus (Nees) Steph. Bull. de l'Herb. Boissier II. **2**: 166. 1902. *Jungermannia Helleriana* Nees; Lindenberg, Nova Acta Acad. Caes. Leop.-Carol. **14**, suppl.: 64. 1829. *Diplophyllum Hellerianum* Dumort. Recueil d'Obs. sur les Jung. 16. 1835. *Jungermannia verruculosa* Lindb. Not. pro F. et Fl. Fenn. **13**: 369. 1874. *Diplophylleia Helleriana* Trevis. Mem. R. Ist. Lomb. III. **4**: 420. 1877. *J. verruculosa*, var. *Helleri* Lindb. Musc. Scand. 8. 1879. *Cephalozia Helleri* Lindb. Medd. Soc. F. et Fl. Fenn. **14**: 65. 1887. *S. Hellerianus* is quoted in Gray's Manual from "N. Eng." but was omitted from the Preliminary List because the record was so indefinite. There is, however, in the herbarium of the New York Botanical Garden, a specimen from the White Mountains, New Hampshire, collected by Oakes, and on the basis of this, the species may be restored. The plant grows on rotten logs, and is usually accompanied by other minute hepatics. Although widely distributed in North America, it is apparently very rare. All of the specimens seen have been provided with gemmae but destitute of floral organs, yet this fact offers no difficulty in their determination because the gemmiparous branches are so striking; they consist of short upright shoots with closely appressed and more or less imbricated leaves, which give off the gemmae from their margins. These leaves are imperfectly developed and differ considerably from the

[1] Bull. Soc. Bot. de France, **49**: 204–209. 1902.

typical leaves on prostrate shoots; they give the gemmiparous branches very much the appearance of those found in *Scapania glaucocephala* and *Odontoschisma denudatum*, both of which are larger species. *S. Hellerianus* may certainly be expected in other parts of New England.

8. CEPHALOZIA JACKII Limpr.; Spruce, On Cephalozia, 67. 1882. *Cephaloziella Jackii* Warnst. Kryptogamenfl. der Mark Brandenburg, **1**: 230. 1902. "On earth at base of a pine tree." Amesbury, Massachusetts (*J. W. Huntington*). This interesting little species is very closely related to *C. divaricata* but is distinguished by its paroicous inflorescence. The species of *Cephalozia* belonging to the subgenus *Cephaloziella* are not clearly understood even in Europe, and this is especially true of *C. divaricata*. Apparently Spruce himself understood this species in too broad a sense and included in it a number of dioicous types which are probably specifically distinct. A few of these have already been separated by Schiffner and others, but the confusion regarding the group as a whole is not yet wholly cleared away. Several of these newly separated species also occur on this side of the Atlantic, but it seems wisest for American students to continue referring them to *C. divaricata* until European writers have reached more definite conclusions.

9. CEPHALOZIA SERRIFLORA Lindb. Medd. Soc. F. et Fl. Fenn. **3**: 188. 1878. *Jungermannia reclusa* Tayl. Lond. Jour. Bot. **5**: 278. 1846 (in part ?). *C. reclusa* Dumort. Hep. Eur. 92. 1874 (in part ?). *C. catenulata* Spruce, on Cephalozia, 33. 1882 (in part). *C. Virginiana* Spruce, *l. c.* 37 (?). Jericho, Vermont (*A. W. E.*); Westville, Connecticut (*A. W. E.*). The specimens from Mount Desert, Maine, collected by E. L. Rand and listed as *C. virginiana* are somewhat doubtful but probably also belong here.[1] In Spruce's description of *C. catenulata* the perichaetial bracts are said to be denticulate as a rule but in rare instances nearly or quite entire. According to more recent European writers Spruce's species includes two distinct specific types, the plants with entire bracts representing the true *J. catenulata* of Hübener and those with denticulate bracts belonging to *J. reclusa* of Taylor. Unfortunately the identity of Taylor's species cannot be satisfactorily established; the plants labeled *J. reclusa* in his herbarium include four or five distinct species in poor condition, and his original description makes no allusion to the bracts. It is

[1] Rand & Redfield, Flora of Mount Desert Island, Maine, 221. 1894.

perfectly evident that he had no definite idea as to the limits of his species, and this statement is fully corroborated by the writings of both Carrington and Spruce. On this account it seems best to give up the name *reclusa* altogether and to apply to this distinct species the later name *serriflora* of Lindberg, a course already pursued by Jack and others. *C. Virginiana* is scarcely distinct from *C. serriflora* and apparently represents a luxuriant form of the species. The range of *C. serriflora* extends from Canada to the Gulf States, the species becoming more abundant southward. In New England it seems to be rare but has probably been overlooked. From other species growing on rotten logs it may be distinguished by its widely spreading and deeply bifid leaves, the acute divisions being straight or slightly connivent; by its leaf-cells with uniformly thickened walls; by its dentate or denticulate perichaetial bracts, and by its thin-walled, three-angled perianth with ciliate mouth. It varies in color from green to brown, and does not become bleached out with age. The true *C. catenulata* is not yet definitely known from North America.

(*To be continued.*)

JUNCUS ARISTULATUS IN NEW ENGLAND.

Eugene P. Bicknell.

It appears from Mr. Fernald's carefully prepared list of New England *Juncaceae* published in Rhodora **6**: 34–41, that *Juncus aristulatus* Michx. is not known as a New England plant. In regard to this Mr. Fernald writes me, "I searched in vain for it in such herbaria as were accessible when I was preparing my list, for it belongs to the flora which is so characteristic of Nantucket and Martha's Vineyard, and I was surprised not to find it creeping into our borders." It should be recorded therefore that this rush does occur within these borders and, moreover, not at all as a feeble straggler but as a definite feature in the flora, reaching a very full development and fruiting prolifically. On September 18, 1899, I found it on Nantucket where it was not uncommon about one general locality somewhat east and north of the middle of the island. Specimens there collected have been forwarded to the Gray Herbarium. It may be added that

the species occurs, but in less vigorous development, at Van Cortlandt, N. Y., not very many miles from the Connecticut State line.

No practised eye which has once rested on this plant in life will hesitate to accept it as entirely distinct from *Juncus marginatus* Rostk., of which it was long supposed to be only a variety, and there is no need of here rehearsing the characters that give it individuality. But Mr. Fernald, referring particularly to the Nantucket specimens, calls my attention to a character of the species in distinction from *Juncus marginatus* which seems to have been generally overlooked. Dr. Small in his Flora of the Southeastern United States has described the larger stamens of *J. aristulatus.* Mr. Fernald observes that these larger exerted stamens with their darkened anthers are persistent and conspicuous in fruit when the small included stamens of *J. marginatus* are usually quite shrivelled and obscure. Something of this same difference in size and persistence is also seen in the styles of the two plants. In the Nantucket specimens these characters are very noticeable, but they are probably not always obvious, since I find them much less evident in certain specimens collected on Long Island.

Some interesting and rather pronounced differences between the seeds of the two plants may here be noted. As seen *en masse*, sprinkled in hundreds in the sheets where the fully matured plants have lain, those of *J. marginatus* are of a dull cinnamon-brown color, those of *J. aristulatus* being of a rather bright brownish-orange in marked contrast. Those of *J. aristulatus* are the more transparent, and though variable are mostly of a very different shape — narrowly oblong rather than oval or short oblong, instead of straight often distinctly curved, sometimes oppositely so at either end, more tapering both ways and distinctly apiculate or short-tailed, sometimes, indeed, with one tailed end fully one quarter the length of the body of the seed itself; in *J. marginatus* the seeds are mostly somewhat blunt, indistinctly apiculate on one end and not more than short apiculate on the other; they are also shorter than those of *J. aristulatus*, sometimes not more than half as long. These differences have proved to be very constant in the specimens I have been able to compare.

WOODMERE, LONG ISLAND.

NOTES ON MARYLAND PLANTS.

Hubert Lyman Clark.

During August, 1903, it was my good fortune to spend several weeks in botanizing on the Eastern Shore, Md. Most of the field work was done in Talbot County, about three miles south of Easton, where the country is much cut up by so-called "creeks" which contain brackish or salt water and are really small branches of Chesapeake Bay. There is very little really fresh water in the way of either ponds or streams, in that vicinity, nor are there many springs. The woods are largely of oak of several species but there is considerable pine still standing. Besides botanizing around Easton, I made two excursions to Ocean City, Md., and investigated the woodland lying between that city and Berlin. The flora along the railroad track in that region is very interesting and is quite characteristically that of pine barrens. Among the many interesting species collected here, those which were of most interest to me were *Polygala lutea*, *Diodia virginiana*, *Ludwigia hirtella*, *Pluchea bifrons*, *Alnus maritima*, *Sagittaria lancifolia*, *Xyris caroliniana*, *Woodwardia augustifolia* and *Lycopodium alopecuroides*.

Both in Talbot County and near Ocean City, plants were found, which seemed to me sufficiently different from the descriptions given in the botanies to raise a question as to the correctness of my identifications. They were therefore sent to the Gray Herbarium of Harvard University where Dr. J. M. Greenman kindly examined them, and I am under great obligations to him for helping me in my difficulty. Among these plants the following seem worthy of special note.

Aspidium cristatum clintonianum D. C. Eaton. Several plants of this handsome fern were found in a little glade, two or three miles southeast of Easton. The discovery extends the recorded range of this variety considerably to the south.

Potamogeton mysticus Morong. This pond-weed was found growing in company with *P. pusillus*, *P. marinus*, *P. pennsylvanicus* and *Naias flexilis* in a shallow body of water, which was fresh at its inland end but opened into the ocean, near Ocean City, Md. As this species has not been collected previously south of Nantucket, its occurrence in Maryland seems quite remarkable.

Tipularia discolor Nutt. As Gray's Manual calls this orchid "very scarce" and Britton and Brown say it is "rare and local," I was greatly surprised to find it quite common in almost every piece of woodland I visited south and east of Easton. In fact it was decidedly the most common of the seven species of orchids found. Although some little time was spent in watching for insect visitors, none were seen.

Desmodium pauciflorum DC. This plant was found in woodland close beside the glade where the Clinton fern was collected, a locality apparently considerably east of its previously recorded range. The flowers were perfectly pure white, in striking contrast to other Desmodiums.

Pluchea petiolata Cass. This species is not very rare in the woodlands south of Easton, a place much north of its previously recorded range. The first specimens were found beside the public highway, in woodland, and were at once distinguishable from other Plucheas by the longer petioles, higher stems and more convex inflorescence; the general appearance was that of depauperate specimens of *Eupatorium purpureum* L. Other specimens were afterwards found in similar situations, moist but not swampy ground in woodland and not near water.

In conclusion, I may add that specimens of these five species have been deposited in the Gray Herbarium.

Olivet, Michigan.

NOTES ON TWO CONNECTICUT GRASSES.

R. W. Woodward.

Poa serotina.— In the summer of 1902, I noticed, at New Haven, Connecticut, a peculiar grass growing for several hundred feet along the edge of a shaded woodland road which leads up out of a wet meadow. In 1903 the same grass was observed in about the same abundance beside this road, and also at several other stations, all of which were in more or less shaded situations. It proved to be a woodland form of *Poa serotina*, Ehrhart, occurring in dry places, and showing marked variation from the species. The culm is more

slender and the panicle less ample, with a varying proportion of the spikelets undeveloped and consisting of a pair of empty scales. The remaining spikelets contain, as a rule, a single, perfect flower with a pedicel of a second abortive flower. The glume of this perfect flower is somewhat webby at the base and slightly pubescent on the lower half of the marginal nerves and the midnerve, with the intermediate nerves obscure or wanting — well known characteristics of *Poa serotina*. But a further and essential character of normal *Poa serotina* is a spikelet with from two to four perfect flowers, while in this woodland form, at least in all the specimens collected by the writer, it is unusual and exceptional when a spikelet develops more than one perfect flower. Spikelets with two perfect flowers occur, however, occasionally. These match spikelets of normal *Poa serotina* in every particular, and connect this perplexing variety with the species. It should be added that the proportion of undeveloped to developed spikelets varies greatly, depending apparently upon the density of the shade. In open woodlands nearly all of the spikelets may be developed and consist of one perfect flower and a second rudimentary flower, as described above. Specimens were collected on July 16, July 21 and August 6, 1903. The ordinary form of the species was in full bloom about July 15. This woodland form is not mentioned in the current standard manuals.

Agrostis intermedia, Scribner. — This species is common in dry woodlands in this vicinity and sometimes makes a dense growth in the more open spaces and in clearings. At one of the New Haven reservoirs there is, bordering the water, a narrow strip of recently cleared land, where this grass has come in, to the exclusion of other species. I collected specimens here on August 14, 1903, and endorsed the sheet, "very abundant, enough for a good crop of hay." On revisiting the spot a few days later, I found that the same idea had occurred to the men employed about the reservoir. They had cut and cured and were just hauling away a small load of hay, weighing several hundred pounds, which was practically all *Agrostis intermedia*.

New Haven, Connecticut.

Pyrola asarifolia, Michx., var. **incarnata**, n. comb.— *P. rotundifolia*, var. *incarnata*, DC. Prodr. vii (1839) 773. *P. incarnata*,

Fisch. ex DC. l. c., as syn. *P. uliginosa*, Torr. & Gray in Torr. Fl. N. Y. i. (1843) 453, t. 69. *P. rotundifolia*, var. *uliginosa*, Gray, Man. Ed. 2 (1856) 259.— *P. rotundifolia*, with which *P. asarifolia* and *P. incarnata* (*P. uliginosa*) have been very generally united, has white flowers 1.5 to 2 cm. broad, and in America occurs in open dry or sandy woods from Prince Edward Island and Nova Scotia to South Dakota and Georgia. *P. asarifolia* and *P. incarnata*, on the other hand, have pink or crimson flowers 1 to 1.5 cm. broad, and occur in cold, wet or mossy woods or in sphagnum from the Gulf of St. Lawrence to Hudson Bay and Alaska, south to northern New England and New York, the Great Lakes and the Rocky Mountains; also in northeastern Asia. Although in dried specimens somewhat resembling *P. rotundifolia*, the plants in the field occupy an area so essentially different and so constantly have pink or purplish smaller flowers that they must be regarded as specifically distinct from the larger white-flowered plant of dry woods of the Atlantic slope. In their extreme forms *P. asarifolia* and *P. incarnata* are separated only by leaf-outline, the former having oblate or round-reniform cordate leaves, the latter obovate or suborbicular leaves rounded to the base. A large series of herbarium specimens and many observations of the plants in northeastern stations show no appreciable difference in the flowers; and too often colonies with leaves connecting the two extremes abound in swamps of northern Maine and Quebec. On this account the plants seem to the writer best treated as phases of one widely distributed species of the northern mossy woods.— M. L. Fernald, Gray Herbarium.

Triosteum perfoliatum in Massachusetts.— At a recent exhibition of native plants at Horticultural Hall, Boston, much interest was taken in specimens of *Triosteum perfoliatum*, L., from East Weymouth, Mass. This species has not before been reported from Massachusetts, the only station heretofore known for it in New England being in Connecticut. For a long time *Triosteum aurantiacum*, Bicknell, has been wrongly called *T. perfoliatum*, but both species were to be seen at this exhibition and the following differences were most noticeable. The opposite leaves of *T. perfoliatum* formed a wide margin where the two united around the stem of the plant, the margin thus formed often measuring half an inch in width on each side of the stem, in this respect much resembling *Eupatorium perfoli-*

atum, L. In *Triosteum aurantiacum*, however, the leaves were abruptly sessile. The leaves of *T. perfoliatum* were so densely pubescent as to be nearly viscid, while those of *T. aurantiacum* were slightly soft-pubescent.

Although both species were in bloom at the same time, yet *T. perfoliatum* was not so far advanced as *T. aurantiacum*, thus indicating a later time of blossoming for the former species.

Triosteum perfoliatum was found growing at the edge of an oak wood near a salt-marsh. Another clump, somewhat farther inland, grew along a stone wall in an old field.

The specimens brought for exhibition were first identified by Mr. W. P. Rich, and later verified by Mr. Alfred Rehder of the Arnold Arboretum.— Alice G. Clark, East Weymouth, Massachusetts.

The Connecticut Flora at the St. Louis Exposition. — The Connecticut Commission, Department of Horticulture, Division of Herbariums, of the Louisiana Purchase Exposition, is exhibiting at St. Louis in the Horticultural Building an herbarium representing the flora of the State. It contains two thousand sheets so arranged on swinging panels that every plant is shown to good advantage. The work has been accomplished through members of the Connecticut Botanical Society and other well known collectors; the following having contributed: Dr. C. B. Graves and Mrs. Elisha E. Rogers representing New London County; Mr. E. B. Harger, Mr. R. W. Woodward and Mr. G. H. Bartlett representing New Haven County; Dr. E. H. Eames and Mr. Amedee Hans representing Fairfield County; Miss Mary C. Seymour representing Litchfield County; Mr. C. H. Bissell, Mr. C. A. Weatherby, Mr. J. N. Bishop, Mr. Irving Holcomb, Miss S. Maria Williams and Mr. A. W. Driggs representing Hartford County. A large part of the material was collected the past year, the work having been started at the opening of the season. This was desirable, as it represents an herbarium of the flora as we know it now. After its exhibition in St. Louis this herbarium is to be returned to Hartford, where it is hoped that it may be made accessible to the public, and prove a help to the student and a source of inspiration and stimulus to all interested in botanical research. — A. W. Driggs, Hartford, Connecticut.

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A SAILOR'S COLLECTION OF ALGAE.

FRANK S. COLLINS.

NOT long ago Dr. N. Wille of Christiania, Norway, placed in my hands for examination a small but interesting collection of American algae: interesting from the extension of range it gave to some species, but even more interesting from the way in which it was made. The specimens were collected by "Steuermann" Axel Moe, on various voyages to this country; from the ports at which the collections were made, and from some of the notes, the vessels in which Mr. Moe sailed were apparently mostly lumber carriers. A large part of the lumber freight from America to Europe is in the hands of the Scandinavians; the ships are not usually the most recent models; often they are vessels no longer available for other business, but the buoyant character of the cargo, and the excellent seamanship of the Swedes and Norwegians that command and man them, make them useful for many years after they would have been given up by other nationalities.

Mr. Moe had apparently no scientific knowledge of algae, but was accustomed to pick up at any port, one or two floating seaweeds that attracted his attention. They are all carefully mounted on paper, with particulars of locality and date. Other specimens, mostly forms of *Sargassum*, were picked up in open sea; and with them latitude and longitude, to the minute, are given in every case. On one voyage his sister, Ragnhild Moe, was with him and collected a few specimens; all the others are his own handiwork. The time during which these collections were made is from 1877 to 1902; the localities range from Newfoundland and Bay Chaleur to Yucatan; the only instances of fresh water algae are specimens of *Stigeoclonium*

and *Ulothrix*, noted as "On pine logs coming down the river" when the ship was at some Florida port.

For new stations, we may note *Gobia Baltica* (Gobi) Reinke, at Louisburg, N. S.; heretofore known in America only by a single finding at Newport, R. I. *Choreocolax Polysiphoniae*, Reinsch, from Nova Scotia, Maine being the former northern limit. *Dermocarpa prasina* (Reinsch) Born. & Flah., at Sydney, former northern limit, Maine. *Sphacelaria cirrhosa* (Roth) Ag., St. Lawrence River; with the exception of the warm-water colony at Quahaug Bay, Maine, not before reported north of Gloucester, Mass. *Dictyosiphon foeniculaceus*, forma *flaccidus*, Kjellm., from Newfoundland; a form extending from the north of Europe to Greenland, but not on record farther south on this coast. *Mesogloia divaricata* (Ag.) J. Ag., Newfoundland, not reported north of Maine. *Ulva fasciata*, Delile, Norfolk, Va., Florida being hitherto the northern limit.

The few species from Progreso, Mexico, are very tantalizing. Almost nothing is known of the algae of the Gulf coast of Mexico. Murray, in his Catalogue of the Marine Algae of the W. I. Region, after noting the rich flora of Florida, says, "The whole coast of the Gulf of Mexico has been ascertained to be barren," but here are very luxuriant specimens of *Caulerpa prolifera* (Forsk.) Lamour., *Codium tomentosum* (Huds.) Stack., *Bryothamnion Seaforthii* (Turn.) Kuetz., and *Eucheuma isiforme* (Ag.) J. Ag. Where these were found, it is more than likely that forms usually found with them elsewhere should also occur; and while we are grateful to Mr. Moe for so much, we can only wish we had been there with him.

The collection includes about seventy species, and it is now deposited in the herbarium of the Botanical Museum at Christiania, Norway. May the example find many followers.

Malden, Massachusetts.

AN UNDESCRIBED VARIETY OF GOLDENROD.

C. B. Graves.

In the summer of 1892 I found in one of the swamps of Waterford, Connecticut, a form of Solidago that was new to me. Notwithstanding that it grew in a decidedly wet situation I was lead to think, on

account of its smooth stem and its general resemblance to *Solidago rugosa*, Mill., that it was the nearly allied *S. ulmifolia*, Muhl., and so considered it up to two years ago. At that time good material of undoubted *S. ulmifolia* was collected on dry rocky ground in the north part of the county, and a careful comparison with the Waterford plant disclosed several marked points of difference. Further study of this swamp plant during the past two seasons has made evident that its closest affinity is with *S. rugosa* rather than *S. ulmifolia*.

As to whether it should be looked upon as specifically distinct from *S. rugosa* there might be an honest difference of opinion, but on account of the discovery of a few plants showing intermediate characters it seems best to regard it as a well marked variety of that species. In 1903 I found the same form in two sphagnum swamps of Voluntown, Connecticut.

Mr. Fernald who has carefully studied the early descriptions and types in Solidago kindly informs me that so far as he can discover this form has not before been described.

It may be characterized as follows:

SOLIDAGO RUGOSA, Miller, var. **sphagnophila**, n. var. Stems from horizontal rootstocks, 9 to 15 dm. tall, simple or occasionally branched above, angular-striate, very smooth, usually dark red or purple but sometimes green.

Leaves numerous, ascending, rather thin, moderately or slightly rugose, pinnately veined, above smooth except near the very rough margin, below somewhat pubescent mostly on the veins with short white hairs, sharply serrate above the proximal third or quarter; leaves of midstem the largest, 7 to 10 cm. long, 1½ to 2 or rarely 3 cm. broad, oblong- or elliptical-lanceolate, somewhat acuminate, gradually narrowed to the sessile base; lower stem-leaves smaller, narrowly oblanceolate, tapering into margined petioles; leaves of upper stem and branches much smaller, oval or narrowly oblong, acute; basal and radical leaves absent at flowering time and not seen.

Inflorescence very variable, from simple to compound corymbose- or racemose-paniçulate, often large and open with long recurved branches; racemes secund, rather densely flowered, more or less pubescent; pedicels 1 to 3 mm. long; heads and rays small, involucre 3½ mm. high, its bracts in about three rows, linear-subulate to oblong-linear, acute or obtuse, firm, smooth or the outer puberulent; rays 6 to 11, disc-flowers 4 to 8; akenes greenish gray 1¼ to 1½ mm. or very rarely slightly more in length, narrowly oblong-obovate, cuneate at base, angular-striate and flattened, hirsute with short ascending stiff white hairs.

Connecticut: Waterford, abundant in sphagnum swamp bordering Fog Plain Brook.
Voluntown, Rhododendron Swamp, and in sphagnous meadow, edge of Great Cedar Swamp.

Not the least interesting feature of this variety is its time of flowering. It is one of our early goldenrods, following close after *S. juncea*, Ait., and *S. odora*, Ait., and antedating *S. rugosa* in the same neighborhood by at least four weeks. This past summer it began to bloom about August first, was well in flower a week or ten days later, and by the end of the month — at a time when the species was barely beginning — the variety was practically out of bloom.

Its preference for wet soil is also noteworthy. Thus far it has been found only in rather open sphagnum swamps and wet boggy meadows. Such of its relatives as are associated with it in these situations, *S. neglecta*, T. & G., *S. serotina*, Ait., and *S. Elliottii*, T. & G., frequently spread up on to the higher and comparatively dry margins of the swamp, but the variety under discussion seems not to occur off the sphagnum.

It is readily distinguished from the species by its perfectly smooth, more striate and usually darker stem, and its relatively smooth leaves. Its early flowering season and its habitat also constitute significant points of distinction. *S. ulmifolia*, Muhl., which at times rather closely resembles this variety is a plant of dry wooded or rocky situations, and comes into flower several weeks later. It also differs in its broader, more ovate, and more pubescent leaves, its usually more slender and open inflorescence, and its akenes which are longer (1½–2½ mm.) less distinctly cuneate at base and much less pubescent than in any observed form of *S. rugosa*.

New London, Connecticut.

Note on Hydrophyllum canadense. — Two references escaped my notice when I was writing my recent paper (Preliminary Lists of New England Plants, — XVII. Rhodora, VI, July, 1904, 151–161). In the Botany of Vermont by William Oakes, published in Thompson's History of Vermont in 1842, *Hydrophyllum canadense* is credited to the State, on page 192, in the following words: "At the base of Mansfield mountain, and frequent in the south west of Vermont. *Robbins*. June." This species should be marked with a line in my list under Vermont.

In the Flora of Vermont by Brainerd, Jones, and Eggleston, published in 1900, under Additions and Corrections, the authors, on page 106, referring to *Hydrophyllum canadense* as occurring in Vermont, cite the specimens collected in Charlotte by Mr. Pringle, and discussed at length by me in the paper above mentioned, on pages 156–158, and say that they "were somewhat abnormal but were so named by Dr. Gray." This statement is entirely contrary to the opinion expressed by Dr. Gray to Mr. Pringle that the plant was "a monstrosity or abnormal condition of *H. Virginicum*," but Pres. Brainerd in reply to my inquiry writes me that the note is a "blunder, resulting from mixing up the two names, *H. canadense* and *H. virginicum*." — WALTER DEANE, Cambridge, Massachusetts.

NOTES ON NEW ENGLAND HEPATICAE,— II.

ALEXANDER W. EVANS.

(*Continued from page 174.*)

10. LEPIDOZIA SETACEA (G. H. Web.) Mitt. Jour. Linn. Soc. Bot. **5**: 103. 1861. *Jungermannia setacea* G. H. Web. Spic. Fl. Goettingensis, 155. 1778. *J. sertularioides* Linn. f. Suppl. 449. 1781. *J. pauciflora* Dicks. Fasc. Pl. Crypt. 2: 15. *pl. 5, f. 9.* 1790. *J. Schultzii* Spreng. Plant. Pug. 1: 64. 1813. *Blepharostoma setaceum* Dumort. Recueil d'Obs. sur les Jung. 18. 1835. *Lepidozia sphagnicola* Evans, Bull. Torrey Club, **20**: 397. *pl. 162.* 1893. The true *Lepidozia setacea* is much rarer in North America than the printed records would seem to indicate. In fact nearly all of the American material which has been referred to this species belongs to the following, and this is true even of the specimens distributed in Hep. Bor.-Amer. *76* and in Hep. Amer. *85*. A number of years ago the writer found an abundant supply of a *Lepidozia* growing in a bog and, recognizing its distinctness from what had passed for *L. setacea* among American writers, described it as new under the name *L. sphagnicola*. Recently, however, these plants have been restudied and carefully compared with European material, and it has become evident that *L. sphagnicola* is a synonym of *L. setacea* and that it is our much commoner plant growing in woods which is undescribed. Specimens

of both species have been submitted to Herr C. Müller, of Freiburg in Breisgau, Germany, who has kindly confirmed the above conclusion. The only New England stations for *L. setacea* which can be definitely cited at the present time are the following: Woods Holl, Massachusetts (*A. W. E.*); Bethany, Connecticut (*A. W. E.*).

11. **Lepidozia sylvatica**, sp. nov. *L. setacea* Auct. (in part). Growing in more or less compact tufts, often in company with other minute hepatics, brownish or yellowish green, varying to pale green: stems 0.08 mm. in diameter, ascending, irregularly pinnate or bipinnate; leafy branches usually lateral, very rarely postical, obliquely or widely spreading; flagelliform branches scanty, usually postical but sometimes terminating a lateral leafy branch; rhizoids sparsely developed, mostly restricted to the lower parts of the leafy axes and to the flagelliform branches: leaves transversely inserted, distant to loosely imbricated; stem-leaves averaging 0.21 × 0.18 mm., deeply trifid or quadrifid to within two or three cells of the base, segments entire, subulate, usually more or less incurved but sometimes straight and squarrose, two cells wide (rarely three or four cells wide) in basal portion and tipped with a row of from two to four cells; branch-leaves similar to the stem-leaves but smaller and usually bifid or trifid; leaf-cells averaging 16 × 14 μ, walls slightly and uniformly thickened, cuticle smooth or very indistinctly verruculose: underleaves of the stem trifid (or very rarely quadrifid) to within one or two cells of the base, 0.15 mm. long, 0.065 mm. wide at base, segments when well developed similar to those of the leaves, one or two of the segments regularly aborted and reduced to one or two cells in length; under leaves of the branches smaller and often only twice divided: inflorescence dioicous: ♀ inflorescence borne on a very short postical branch, often with no leaves except those of the involucre; bracts and bracteoles in two or three rows, scarcely distinguishable from one another, those of the innermost row ovate, 1 mm. long and 0.35–0.5 mm. wide, usually bifid about one fourth with acuminate and denticulate or ciliolate divisions and a sharp and narrow sinus, rarely undivided, entire or sparingly toothed near base, cells longer and with thinner walls than in the leaves, cuticle more distinctly verruculose; bracts and bracteoles of second and third rows successively smaller and more regularly bifid; perianth narrowly ovoid or cylindrical, 2.7 mm. long, 0.6 mm. in diameter, terete below, bluntly trigonous above, the keels separated by narrow grooves, mouth more or less contracted, ciliate, the cilia one to four cells long and one or two cells wide at the base, cells of the perianth similar to those of the bracts: ♂ inflorescence borne on a short postical or, more rarely, lateral branch, usually proliferating at the apex into a leafy axis; bracts in four or five pairs, strongly concave, ovate, 0.35 mm. long, 0.2 mm. wide, bifid about one-half, the divisions acuminate, short-ciliate on the margins, sinus sharp, bracteoles mostly bifid

with subulate divisions; antheridia solitary, oval: capsule oval, yellowish brown, 0.9 mm. long, 0.5 mm. in diameter; spores minutely verruculose, yellowish brown, 12 μ in diameter; elaters reddish brown, with two spirals, 9 μ in diameter.

On shaded banks and rotten logs. New Hampshire. White Mountains (*Oakes*).[1] Massachusetts: Woods Holl (*A. W. E.*); Amesbury (*J. W. Huntington*); West Newbury (*Miss C. C. Haynes*). Connecticut: Westville (*R. Veitch, A. W. E.*); New Haven and Orange (*D. C. Eaton*); Hamden (*D. C. Eaton, A. W. E.*). The Westville specimens collected by the writer in April, 1903, may be designated the type. The following stations beyond the limits of New England may also be noted: Quaker Bridge, New Jersey (*A. W. E.*); Washington, D. C. (*J. M. Holzinger*); Tibbs Run, West Virginia (*A. LeRoy Andrews*); Dickey's Creek, Virginia (*Mrs. Britton & Miss Vail*); Enterprise, Florida (*L. M. Underwood*).

The leaf subtending a lateral branch in *L. sylvatica* is sometimes bifid and sometimes undivided; in other cases there is no subtending leaf whatever (*fig. 3*). The latter condition in fact is normally found on one side of a branching axis while subtending leaves occur on the other. The absence of such a leaf indicates that the whole, instead of a part, of an apical segment has entered into the formation of the branch. This substitution of a branch for an entire leaf is of especial interest and has not before been noted in the Hepaticae, although its occurrence was long ago suspected by Leitgeb.[2] The subtending leaves are sometimes found on the right hand side of an axis and sometimes on the left, according to the direction of the spiral. Similar variations also occur in *L. setacea*.

In their vegetative organs *L. setacea* and *L. sylvatica* resemble each other very closely, and it is sometimes difficult to determine sterile and poorly developed material. Usually, however, the leaves and especially the underleaves offer a few reliable points of difference. Under favorable conditions *L. setacea* is more robust, and its leaves are more regularly quadrifid; in many cases the antical segment bears an accessory tooth on its free margin, a condition which is exceedingly rare in *L. sylvatica*. Occasionally a bifid subtending leaf will show an accessory tooth of this character on each side. The

[1] These specimens have not been seen by the writer; further reference is made to them on page 189.

[2] Bot. Zeit. **29**: 562. 1871.

cuticle of *L. setacea* is distinctly verruculose while that of *L. sylvatica* is smooth or very indistinctly roughened. Unfortunately in slender forms of *L. setacea* these differences are not always apparent.

The underleaves of *L. sylvatica* are usually trifid but are occasionally quadrifid on very robust axes and are not infrequently bifid on slender branches. One or two of the divisions are tipped with the remains of hyaline papillae and are thereby aborted in their growth and reduced to one or two cells in length; the divisions without papillae become almost as long as the segments of the leaves. In *L. setacea* quadrifid underleaves are the rule on principal axes, although trifid and even bifid underleaves occur on the branches. Here again the remains of hyaline papillae may be detected on the tips of the divisions; apparently, however, they do not interfere to any great extent with the development of the segments, which never exhibit the extreme disparity in size found in *L. sylvatica*. Even on slender forms of *L. setacea* this difference in the underleaves seems to be constant.

The most important differential characters, however, are afforded by the perichaetial leaves. These have been repeatedly figured for *L. setacea*, but unfortunately the figures show little uniformity. The same statement will also apply to the published descriptions. In Hooker's British Jungermanniae (1816), the perichaetial leaves are figured twice: on plate 8, they appear deeply laciniate with very slender divisions; on plate 1 of the supplement, they are ovate in outline and undivided. Nees von Esenbeck[1] comments on plate 8 and states that he has never observed the bracts so finely laciniate; Gottsche[2] criticises the same figures and also remarks that those given on plate 1 are untrue to nature because they represent the bracts as being undivided; Austin[3] accepts the supplementary figures of the perichaetial leaves but rejects entirely those given on plate 8. As a matter of fact the bracts are almost intermediate in character between the two figures of Hooker; they are more or less deeply trifid or quadrifid with lanceolate, acuminate, dentate or ciliate divisions separated by very narrow sinuses. In some cases the primary divisions of the innermost bracts are not very deep, and oftentimes the laciniation seems to be even better marked on unfer-

[1] Naturgeschichte der europ. Lebermoose, **2**: 299. 1836.

[2] G. & R. Hep. europ. *655*. 1879.

[3] Hep. Bor.-Amer. *76*. 1873.

tilized flowers than on those with well developed perianths. Of later figures those published by Stephani[1] and Müller[2] bring out the characters pretty clearly. Pearson,[3] however, describes and figures the bracts as "bidentate" with the "segments ciliate-dentate, acuminate"; but, as these figures of the bracts are all drawn from North American specimens collected by Oakes in the White Mountains, it is hardly to be doubted that they represent *L. sylvatica* instead of the true *L. setacea*. It is also probable that Austin had no American material of *L. setacea* before him when he rejected Hooker's figures. Fertile material of *L. sylvatica* may be at once distinguished by the perichaetial leaves, some if not all of which will show the bifid character.

In the ciliate mouth of the perianth the two species agree with each other but differ from the recently described *L. trichoclados* C. Müll. Frib.,[4] in which the mouth is minutely denticulate. *L. trichoclados* is now known from several widely separated localities in Europe and is perhaps to be expected in North America. It is a fragile species and is hardly to be distinguished in sterile condition from slender forms of *L. setacea*. It is remarkable, however, for its short and delicate bracts, which are ovate in outline, slightly bidentate at the apex and irregularly denticulate in the upper part. *L. trichoclados* is also noteworthy because it matures its capsules in November; in the other two species these are matured in May or June.

12. SCAPANIA CONVEXULA C. Müll. Frib. Bull. de l'Herb. Boissier, II. **3**: 42. 1903. Mt. Katahdin, Maine (*E. D. Merrill*), the type-locality.

13. SCAPANIA PALUDOSA C. Müll. Frib. *l. c.* 49. *pl. 1*. *S. undulata*, var. *paludosa* C. Müll. Frib. Beih. zum Bot. Centralbl. **10**: 220. 1901. Tuckerman's Ravine and Mt. Pleasant, White Mountains, New Hampshire (*A. W. E.*); Mt. Mansfield, Vermont (*A. W. E.*); Magnolia, Massachusetts (*W. G. Farlow*).

The two species just noted are fully described by Herr Müller. *S. paludosa* is by far the commoner of the two and has a wide distribution in Europe, especially in subalpine regions; *S. convexula*, on the other hand, is known from the type-locality only. Both spe-

[1] Ber. d. botan. Ver. zu Landshut, **7**: *f. 83*. 1879.

[2] Hedwigia, **38**: *pl. 8, f. 14–16*. 1899.

[3] Hep. Brit. Isles, 124. *pl. 46, f. 13–17*. 1900.

[4] Hedwigia, **38**: 197. *pl. 8, f. 1–13*. 1899.

cies are allied to *S. undulata*; *S. convexula* is distinguished by its cordate antical lobe, the margin of which is coarsely spinose-dentate; *S. paludosa* is a delicate and flaccid species in which the antical lobe is broadly orbicular in outline, more or less cordate where it meets the postical lobe and distinctly decurrent on the other side. In *S. irrigua*, which is also closely related to *S. paludosa*, the lobes of the leaves are usually apiculate at the apex instead of being rounded.

In the writer's Preliminary List of New England Hepaticae, 123 species are noted. Of this number, 75 are accredited to Maine, 81 to New Hampshire, 67 to Vermont, 76 to Massachusetts, 65 to Rhode Island and 93 to Connecticut; while 31 species are accredited to all six of the New England States. During the short time which has elapsed since the publication of this list, additions have been made to the hepatic floras of every State except Rhode Island, and the majority of these are the result of explorations made during 1903. The most noteworthy of these additions have already been referred to in the preceding pages; the others are as follows:

For Maine. *Riccia Sullivantii;* Waterville (*E. B. Chamberlain*): this record was inadvertently omitted from the Preliminary List. *Harpanthus scutatus;* The Sands, near Prospect Harbor (*Mrs. A. R. Northrup*): specimens from this locality were kindly sent the writer by Miss Haynes.

For Vermont. *Frullania Brittoniae;* Jericho (*A. W. E.*). *F. riparia;* North Pownal (*A. LeRoy Andrews*). *Jungermannia lanceolata;* Willoughby (*Miss Lorenz*). *J. pumila;* Jericho (*A. W. E.*). *Lophozia Floerkii;* Mt. Mansfield (*A. W. E.*). *L. marchica*, *Mylia anomala*, *Scapania irrigua* and *Notothylas orbicularis;* Jericho (*A. W. E.*).

For Massachusetts. *Fossombronia Wondraczeki;* West Newbury (*Miss Haynes*). *Radula tenax;* Magnolia (*W. G. Farlow*). *Scapania curta;* Mt. Holyoke (*Miss Lorenz*).

The census of New England Hepaticae now stands as follows: total number recorded, 128; number recorded from Maine, 79; from New Hampshire, 85; from Vermont, 78; from Massachusetts, 83; from Rhode Island, 65; from Connecticut, 94; from all six States, 33.

YALE UNIVERSITY.

EXPLANATION OF PLATE 57.—*Lepidozia sylvatica* Evans. Fig. 1, part of plant with perianth, the latter seen from the postical aspect and enclosing a detached sporophyte, × 35; Fig. 2, part of sterile plant, postical view, × 50;

Fig. 3, part of stem with the bases of three branches, antical view, × 50; Fig. 4, ♂ inflorescence, lateral view, × 60; Fig. 5, stem-leaf, × 220; Figs. 6, 7, underleaves of stem, × 220; Figs. 8–10, perichaetial leaves of innermost row, × 35; Figs. 11–13, perichaetial leaves of second row, × 35; Fig. 14, transverse section of perianth in upper third, × 35; Fig. 15, teeth from mouth of perianth, × 220; Fig. 16, perigonial bract, × 60; Fig. 17, perigonial bracteole, × 60. The figures were all drawn from the type-specimen and were prepared for publication by Miss Edna L. Hyatt.

The Identity of Andersson's Salix pellita. — *Salix pellita*, Anders. Mon. Salix (1865) 139, was based on two plants, one from Lake Winnipeg (*Bourgeau*), the other from the Rocky Mountains (*Lyall*). Material of the Lyall plant in the Gray Herbarium is different from any eastern species, but is very near the recently described *S. subcaerulea*, Piper, which occurs from the mountains of Oregon and Northern California to Montana. In August, 1903, the writer examined at Kew original material of the Winnipeg plant of Bourgeau and found it quite unlike the Lyall specimen but exactly a species which abounds along certain rivers of Maine and eastern Canada; and since the Winnipeg shrub was first cited by Andersson, it, rather than the Rocky Mountain element of his complex species must bear the name, *S. pellita*. This species has long perplexed the botanists who are familiar with northern Maine; and for want of a more satisfactory disposition for the plant, it has been temporarily placed with *S. candida*. From that species, however, *S. pellita* is very quickly separated. *S. candida*, as yet unknown in Maine, is a species primarily of larch or arbor-vitae swamps, the branchlets, leaves (usually above as well as beneath) and capsules pubescent with *dull* whitish *lanate or flocculent tomentum*; and the young styles conspicuously tinged with crimson. *S. pellita*, a species ordinarily of gravelly or well-drained shores, has the young branchlets glabrous or at most minutely pilose, the leaves glabrous or quickly glabrate above, whitened beneath, at least when young, with *lustrous velvety or silky pubescence*; the ovaries and capsule *silky-tomentose*; the styles yellowish or brownish. In northern Maine and adjacent Canada *S. pellita* is one of the commonest willows, and the material now at hand shows it to range from the Dartmouth River, Gaspé County, Quebec, to the lower Androscoggin River, Maine, north to Lake St. John, Quebec, and west to Lake Winnipeg. — M. L. Fernald, Gray Herbarium.

TENTH ANNUAL MEETING OF THE JOSSELYN BOTANICAL SOCIETY OF MAINE.

DORA H. MOULTON, Secretary.

A PARTY of twenty-six enthusiastic members and friends of the Josselyn Botanical Society of Maine entered the St. John Valley on July 6th, for four days work along the gravelly shores and steep banks of the river, and among the adjacent bogs and hills. The Society received most courteous treatment at Hotel Dickey, Fort Kent, where everything possible was done for the comfort of the party. The evenings were spent comparing and discussing the collections of the day. On Friday evening Mr. M. L. Fernald delivered an address on "The Flora of the St. John Valley"; and Dr. George Upham Hay, of St. John, New Brunswick, spoke of the fungi collected, and extended greetings from the Botanical Club of Canada, of which society he is the president. Most favorable weather made it possible to explore a distance of practically thirty miles along the banks of the river. Everywhere, on roadsides, riverbanks and open places, the blue of *Vicia Cracca*, L., and *Campanula rotundifolia*, L., was most conspicuous, and with the yellow of the buttercups and the white of the daisies, made clearly defined bands or ribbons of color bordering the roads.

This region is rich in local plants, and among such species were noted *Astragalus alpinus*, L., *Tanacetum Huronense*, Nutt., *Castilleja pallida*, var. *septentrionalis*, Gray., *Hedysarum boreale*, Nutt., *Vaccinium caespitosum*, Michx., *Carex castanea*, Wahl., *Graphephorum melicoideum*, Desv., *Equisetum palustre*, L., and *E. variegatum*, Schl., growing in scattered patches over the drier gravelly shores. *Artemisia Canadensis*, Michx., was seen on the beach at St. Hilaire, New Brunswick, but not noticed on the Maine shore. In the deep wet sands *Utricularia intermedia*, Hayne, flowered abundantly. Here also, everywhere on the wet beaches, grew *Primula Mistassinica*, Michx., and *Tofieldia glutinosa*, Willd., while back, in what might be termed the river meadows, were an abundance of *Anemone Canadensis*, L., and large patches of *Angelica atropurpurea*, L. On the steep slopes were seen *Halenia deflexa*, Griseb., *Pedicularis Furbishiae*, Wats., and *Clematis verticillaris*, DC. In springy spots was found *Myosotis laxa* Lehm., previously unknown in the valley. Back from

the river in wet arbor-vitae swamps were found *Microstylis monophyllos*, Lindl., and *Luzula parviflora*, Desv. In rich alluvial woods grew *Pyrola asarifolia*, Michx.; in the upland evergreen woods *Pyrola minor*, L. and occasionally *Goodyera Menziesii*, Lindl. (very scarce), and *Geum macrophyllum*, Willd. *Thlaspi arvense* L. was frequent in barnyards.

There are fourteen plants previously known as occurring in the St. John Valley but not reported in the Portland Catalogue, which are worthy of special mention. Possibly the most conspicuous of this group is *Oxytropis campestris*, var. *Johannensis*, Fernald, growing everywhere on the rocky beaches. On these beaches, also, *Salix glaucophylla*, Bebb, and *S. pellita*, Anders., and on the wet gravelly shores *Calamagrostis neglecta*, Trin., grow in great abundance. *Poa glauca*, L., and *Carex vesicaria*, var. *Raeana*, Fernald, are more scattered on the river banks. The latter plant has been previously known only from Methaye Lake, Athabaska, Lake St. John, Quebec, and the Rangeley Lakes, Maine. *Equisetum pratense*, Ehrh., abounds in alluvial woods; and *Lycopodium complanatum*, L. (true), *L. Sitchense*, Rupr., and *L. sabinaefolium*, Willd., grow in the upland evergreen forest. *Veronica serpyllifolia*, L., var. *borealis*, Laest., in springy spots, and *Gnaphalium sylvaticum*, L., in sterile soil, are both rather common. *Listera auriculata*, Wiegand, somewhat rare, is apparently found only in sandy alluvium. *Viola Labradorica*, Schrank (true), found on ledges, has been previously known in Maine from various stations in the St. John Valley and from the cliffs of Mt. Katahdin.

Two plants new to the State may be credited to the explorations of this time. One is *Osmorrhiza divaricata*, Nutt., local in rich upland woods, a Rocky Mountain species first found in the East at Rivière du Loup, Quebec, by E. F. Williams and M. L. Fernald in 1902. The other plant is *Equisetum variegatum*, var. *Jesupi*, A. A. Eaton, found on gravelly shores.

A new station for *Anemone riparia*, Fernald, *A. multifida*, Poir. *Erigeron hyssopifolius*, Michx., and *Cynoglossum Virginicum*, L., was found by a small party who remained longer in this region.

PORTLAND, MAINE.

NEW STATIONS FOR MAINE PLANTS.

Edward B. Chamberlain.

During the past few years several plants have come to my notice whose distribution in Maine or in New England seems to warrant calling attention to them here. Specimens of all the species here noted are in my own herbarium; and in almost all cases there are duplicates in the Gray Herbarium, or in the Herbarium of the New England Botanical Club.

Carex alopecoidea, Tuck.— On alluvial banks at Vassalboro, Kennebec Co., Maine, collected July 3, 1902. This is the first station in New England outside of the Champlain valley.

Carex grisea, Wahl.— Growing with the preceding species at Vassalboro. Previously reported in Maine only from Waterville.

Carex Houghtonii, Torr.— Roadside in Falmouth, a very limited station.

Carex polymorpha, Muhl.—This rare and local sedge was found by the writer and Mr. C. H. Bissell in July, 1902, while botanizing near Underwood Springs in Falmouth. Since then the plant has also been found in Cumberland. These stations extend the range considerably from the station at Wells, where it was collected by the Rev. Joseph Blake.

Carex vestita, Willd.— Brunswick, Maine, in a sand pit, collected by the writer in 1898. Previously reported from North Berwick by Mr. J. C. Parlin, in the second Supplement to the Portland Catalogue of Maine Plants.

Scirpus pedicellatus, Fernald.— Specimens were collected at Cumberland in September, 1902, and determined by Mr. Fernald. Apparently the plant has not been reported from Maine before.

Carya alba, Nutt.— Rather common in some parts of Falmouth, Cumberland and North Yarmouth, especially in the localities known as Bruce Hill and Presumpscot Gorge. There is also a specimen in my herbarium collected in woods at Turner, Maine, June 27, 1897, by John E. Dinsmore. These stations extend northward the range given in Dame and Brooks, "Handbook of the Trees of New England," p. 49.

Ranunculus ambigens, S. Wats.— Abundant in a muddy ditch at

Cumberland Center. This station is near the northern limit of the plant in Maine.

Sedum stoloniferum, Gmel.— This plant, a native of Asia Minor and adjacent Europe, is well established and spreading in a yard at Cumberland Center. It is doubtless a relic of earlier cultivation, but no garden has been on the spot for ten or fifteen years, while the area occupied is steadily increasing.

Poterium Sanguisorba, L.— Abundant in a mowing field at Cumberland Foreside.

Vicia tetrasperma, L.— Abundant at one station on the Maine Central Railroad near Cumberland Junction, where it has persisted for three years at least. This summer, 1904, it has also been collected by Dr. D. W. Fellows at Cumberland Foreside, some three miles from the first station.

Euphorbia hirsuta, Wiegand.— Very abundant along the Grand Trunk Railroad in Cumberland and Yarmouth.

Nyssa sylvatica, Marsh.— Occasionally found in swampy woods in Cumberland and North Yarmouth, in some cases growing in large clumps with trees 30 or 40 feet in height.

Galium boreale, L.— Quite abundant in a field at Pleasant Pond, Caratunk, in Somerset county, where it was collected by Mr. J. Franklin Collins and the author in August, 1902. It has been reported by Mr. L. H. Baker from Exeter, Maine, in RHODORA, I. 75.

Houstonia purpurea calycosa, Gray.— One clump of this variety was found in 1902 at Cumberland Center; previously it has been reported by Mr. J. C. Parlin from North Berwick.

CUMBERLAND CENTER, MAINE.

SOME UNUSUAL CONNECTICUT PLANTS.

C. B. GRAVES.

Panicum Commonsianum, Ashe.— In June, 1903, this species was found growing sparingly on a gravelly railroad bank at Giant's Neck, in East Lyme. The determination was confirmed by Prof. A. S. Hitchcock, of Washington, D. C. This is its second record from Connecticut, the first being by Mr. C. A. Weatherby (RHODORA VI, 42).

Juncus tenuis, Willd., var. *Williamsii*, Fernald.— It may be of interest to record the fact that the distribution of this well marked variety reaches quite to the southern border of New England. Characteristic specimens were collected both last year and this present summer in the town of Groton, close to the shore of Fisher's Island Sound.

Rubus Canadensis, L.— Inasmuch as since the recent overturning in the genus Rubus the older records will be of little value in fixing distribution, it may be worth while to note that last August this species, the smooth unarmed high blackberry of the mountains, was collected by me at Bigelow's Gorge in Union.

Rosa nitida, Willd.— This northern form was discovered in August, 1903, in an extensive cedar swamp in the northeastern part of Stafford. The Gray Herbarium contains no material from any locality south of the Massachusetts line, and so far as I am aware it has not before been found in Connecticut. The record in Bishop's catalogue from East Hartford was, as I am informed by Mr. A. W. Driggs, based upon an error.

Tilia pubescens, Ait.— Several small trees of this species were seen last September on the wooded slopes bordering the Shetucket River in the town of Sprague. They were sterile at that time, but comparison of the leaves with material at the Gray Herbarium seemed to leave no doubt as to the correctness of the determination. This form does not appear to have been previously recorded from New England.

New London, Connecticut.

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Lepidozia sylvatica, Evans.

Rhodora

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THE AMERICAN REPRESENTATIVES OF PYROLA ROTUNDIFOLIA.

M. L. Fernald.

It has long seemed strange that the handsome plants passing as *Pyrola rotundifolia* should occupy in Europe and America geographic areas of such different character. The European plant is a species of northern and mountainous districts, extending from latitude 73° in Greenland,[1] latitude 67° in Lapland,[2] and Iceland and the Faroe Islands across much of Europe and western Asia to latitude 45°, and very rarely southward in the Pyrenees, Apennines, and other mountains.[3] An extreme Arctic representative of the plant, *P. grandiflora*, Radius (*P. groenlandica* and *P. pumila*, Hornem., *P. rotundifolia*, var. *pumila*, Hornem.) occurs in Greenland and the Arctic regions of America, extending south in Labrador to Hopedale (latitude 55° 40′). In Europe the range of *P. rotundifolia* closely approximates that of *P. minor*; and a third species, *P. media*, Swartz, unites to such an extent the characters of *P. rotundifolia* and *P. minor* that European botanists often find difficulty in distinguishing it.[4]

The large white-flowered plant which in America has long passed as true *Pyrola rotundifolia* occurs in open dry or sandy woods, rarely in swamps, from the Baie des Chaleurs, Quebec (latitude 48° 10′) west to South Dakota and south beyond latitude 35° into Georgia. Its range in America is thus much more southern than that of *P.*

[1] Lange, Consp. Fl. Groen. 85 (1880).

[2] N. J. Andersson, Pl. Vasc. Quickjock Lap. Lulensis, 27 (1845).

[3] See Nyman, Consp. Fl. Eur. 492 (1879).

[4] "P. media, Swartz. . . . Perhaps a mere variety of *P. minor*, and sometimes passing almost into *P. rotundifolia*."— Bentham, Brit. Fl., ed. 4, 300 (1878).

minor (the European associate of *P. rotundifolia*), a species occurring in arctic and subarctic America, extending southward in cold fir and spruce forests and deep swamps to Cape Breton, the higher mountains of northern New England, the Great Lakes, and the Rocky Mountains. At no point, except possibly the extreme northern limit of *P. rotundifolia* and the extreme southeastern limit of *P. minor* (where each species is rare and local) do their ranges coincide; and nowhere in America, so far as known, has there ever been found any transition between the two species, such as is represented in Europe by *P. media*.

Superficially the three plants, the European *Pyrola rotundifolia*, the Arctic *P. grandiflora*, and the so-called *P. rotundifolia* of temperate America, present little to indicate that they may not be phases of one broadly distributed species; and as such they have been treated by many authors, who, at the same time, have included with them *P. asarifolia*, Michx. and *P. bracteata*, Hook., both species of well defined characters and geographic range. In general, the plant of temperate North America is taller and has larger leaves, while the Arctic *P. grandiflora* is lower and with smaller leaves than *P. rotundifolia* of Europe.[1] In general, too, *P. grandiflora* of the Arctic regions and the plant of the eastern United States and Canada have much larger flowers with thicker petals than the European species, but in plants from northern Scandinavia the corolla is as large as in average American specimens.[2]

A comparison of the stamens brings out certain points which indicate, even more than the geographic range and the variation in size and texture of the petals and the size of the leaves, that the three plants are probably best treated as distinct species, or at least as well developed geographic subspecies. In the large-flowered plant of the eastern United States and Canada the filaments are shorter

[1] Measurement of 50 American herbarium-specimens shows a range in height from 9 to 36 (average 25) cm.; of 28 European plants a range from 15 to 30 (average 20) cm.; of 25 Arctic plants a range from 5 to 16 (average 10) cm. The leaves of the American plants show a range in the length of blade from 2 to 6.8 (average 4.4) cm.; of the European from 1.9 to 4.6 (average 3.3) cm.; of the Arctic from 1 to 3 (average 2) cm.

[2] Petals of 20 herbarium specimens of the plant of temperate America vary in length from 6.5 to 10.5 (average 8.4) mm.; of 20 European specimens they vary from 5.5 to 8 (average 6.5) mm.; of 20 Arctic American plants from 7.5 to 11 (average 8.7) mm.

while the anthers are distinctly longer than in the small-flowered European plant. In the largest-flowered member of the group, *P. grandiflora* of the Arctic regions, on the other hand, both the filaments and the anthers are shorter than in either the small-flowered European *P. rotundifolia*, or the large-flowered plant of temperate North America.[1]

In *Pyrola rotundifolia* of Europe and the Arctic *P. grandiflora* the anthers are muticous or rarely mucronulate at base. In the so-called *P. rotundifolia* of eastern America, as in *P. asarifolia* and *P. bracteata*, the base of the anther is distinctly mucronate. In the specimens at hand this character is very apparent, but, for the most part, current descriptions of *P. rotundifolia*, based upon both European and American material and generally including *P. asarifolia*, *P. bracteata*, *P. grandiflora*, etc., are similar to that in the Synoptical Flora: "the mucro at base either short and distinct or obsolete."[2]

At least one monographer of the group, however, Dr. Alefeld, basing his description solely upon Old World material,[3] says in his extended diagnosis: "antherae . . . . muticae."[4] In this connection, furthermore, it is interesting to note, as our present knowledge of plant-distribution might lead us to expect, that the material examined from Japan, Manchuria, and Korea has not only the large leaves and flowers but the large prominently mucronate anthers of the American plant. This fact was emphasized in 1872 by the discriminating Maximowicz who, in his "Diagnoses plantarum novarum Japoniae et Mandshuriae," commented on the monograph of Alefeld and stated that in the Japanese and American material the anthers were all mucronulate at base, though in Europe, where they are said to be muticous, mucronulate anthers often occur.[5]

[1] The stamens of the American plant show a range in length from 4.75 to 7 (average 6) mm., the anthers from 2.75 to 3.6 (average 3.2) mm.; of the European plant from 5 to 7.75 (average 6.27) mm., the anthers from 2 to 3 (average 2.5) mm.; of the Arctic plant from 4 to 5.5 (average 5) mm., the anthers from 1.7 to 2.3 (average 2) mm.

[2] Gray, Syn. Fl. ii. pt. 1, 47 (1878).

"[3] Da ich in allen Herbarien nur europäische oder asiatische, niemals amerikanische Examplare sah, so kann ich auch die von anderen Autoren angegebenen Standorte dieser Art für Amerika nicht anführen."— Alefeld, Linnaea, xxviii. 64 (1856).

[4] Alefeld, Linnaea, xxviii. 63 (1856).

[5] "Signa, quibus denuo tentavit dignoscere *P. asarifoliam* et *P. rotundifoliam* monographus Alefeld, sunt: calycis laciniae in priore breviores, antherae basi mucronulatae et stylus corollam aequans. In meis speciminibus numerosis e *Japonia* calycis laciniae occurrunt saepe lanceolatae, quales a monographo *P.*

Among the European specimens examined by the writer only two show the mucronulate base of the anther referred to by Maximowicz, but in these the mucro is much shorter than in anthers of the American plant and in their other characters the specimens are clearly referable to the European type. The mucronate base of the anther, then, although not an invariable character, is worthy at least of secondary consideration in distinguishing from the European and the Arctic species the plant of Eastern America and Asia.

In the European *Pyrola rotundifolia* the anther-cells are slightly constricted above, forming very short nearly straight necks or tubes through which open the pores. In the Arctic *P. grandiflora* these necks are essentially wanting; but in the plant of temperate America, Japan, etc., the necks are continued as prominent curved processes.

In the form of its style the Arctic *Pyrola grandiflora*, furthermore, presents a character which seems to separate it very clearly from the European *P. rotundifolia* and its larger American and East Asian representative. In the two latter plants the style is terminated by a distinct ring above which are the five protruding stigmatic lobes. In *P. grandiflora* this ring is nearly if not quite obsolete.

From these comparisons it seems that the plants of Northern Europe, of the Arctic regions of Greenland and America, and of eastern temperate North America and northeastern Asia are well defined members of the subgenus *Thelaia*. The two former are clearly referable to *Pyrola rotundifolia*, L., and *P. grandiflora*, Radius. The plant of eastern America and Eastern Asia has, however, been very generally accepted as identical with the Old World *P. rotundifolia*. Only one author, so far as known, has previously maintained for the plant specific validity.[1] Robert Sweet, in 1830, gave the plant an

rotundifoliae tribuuntur, stylus corollam aequans vel superans, antherae vero omnes basi mucronulatae. Ita inveni etiam in americanis, nempe calycis lacinias variabiles, antheras vero mucronulatas. At in europaeis, ubi antherae muticae postulantur, in permultis (scandinavicis, germanicis, galiicis) etiam mucronulatas video."—Maximowicz, Bull. Acad. Imp. Sci. St. Pét. xviii. 623 (1872).

[1] *Pyrola rotundifolia*, as published by Linnaeus in the Species Plantarum (396), included the American as well as the European plant; and among other citations was that of "Pyrola noveboracensis. *Cold. noveb.* 99." Colden's *P. noveboracensis*, published in Act. Soc. Upsal. 1743, p. 122, no. 99, was probably the large American plant, but I am unable to find that it has been taken up by any post-Linnean author as a species distinct from *P. rotundifolia*. Treated by Linnaeus and all subsequent authors as a pure synonym of *P. rotundifolia*, the pre-Linnean name, *P. noveboracensis*, can hardly be given nomenclatorial precedence over the post-Linnean *P. americana*, Sweet.

appropriate name, though, unfortunately, he failed to point out the characters upon which he based his conclusion. Sweet's Hortus Britannicus was, as its secondary title explains, "a catalogue of plants, indigenous, or cultivated in the gardens of Great Britain." The species under each genus were numbered separately, then were indicated the color, English name, geographic source, hardiness, duration, etc. The American plant, the ninth in Sweet's list of Pyrolas, was thus entered:

"9. americàna. (*wh.*) American. N. America. . . . . H. ♃.
rotundifòlia Ph. *non* Eng. bot."[1]

The reference to *Pyrola rotundifolia* of Pursh, not of the English Botany, alone defines Sweet's species, for there can be no doubt that Pursh's plant, "in dry stony or sandy woods: Canada to Carolina,"[2] was the common large-flowered plant of eastern America, which, treated as a valid species, should bear the name *P. americana*, Sweet.

Briefly, the conclusions reached in this study are, that *Pyrola rotundifolia*, *P. grandiflora*, and *P. americana*, are distinct though closely related species, each occupying a well defined geographic area and maintaining with essential constancy certain characters notably in the size of the petals, and the size, proportions, and forms of the anthers and filaments.

The leading characters of the plants are:

PYROLA ROTUNDIFOLIA, L. Sp. 396 (1753), as to European plant — including var. *arenaria*, Koch. Syn. 478 (1837). *Thelaia rotundifolia*, Alefeld, Linnaea, xxviii. 60 (1856). Plant varying in height from 15 to 30 (average 20) cm.: leaf-blade from 1.9 to 4.6 (average 3.3) cm.: petals comparatively thin, white or slightly purple-tinged, 5.5 to 8 (average 6.5) mm. long: stamens 5 to 7.75 (average 6.27) mm. long; the anthers 2 to 3 (average 2.5) mm. long, muticous or rarely mucronulate at base, the cells narrowed above to short straightish necks: style with a distinct ring or collar below the 5 protruding lobes of the stigma.— Greenland, Iceland, and Lapland, across northern and central Europe and western Asia and locally southward in the mountains.

P. AMERICANA, Sweet, Hort. Brit., ed. 2, 341 (1830). *P. rotundifolia*, Am. auth., mostly. Plant 9 to 36 (average 25) cm. high: leaf-blade 2 to 6.8 (average 4.4) cm. long: petals thick, cream-white, rarely pink-tinged, 6.5 to 10.5 (average 8.4) mm. long: stamens 4.75 to 7 (average 6) mm. long; anthers 2.75 to 3.6 (average 3.2) mm.

[1] Sweet, Hort. Brit., ed. 2, 341 (1830).

[2] Pursh, Fl. 299 (1814).

long, mucronate at base, the cells constricted above to prominent arched necks: style similar to that of *P. rotundifolia.*— Baie des Chaleurs, Quebec to South Dakota and Georgia; Japan, Korea, Manchuria.

P. grandiflora, Radius, Diss. Pyrol. 27, t. 3, fig. 2 (1821). *P. rotundifolia*, var. *pumila*, Hornem. dansk. oecon. Plantel., ed. 3, 463 (1821). *P. groenlandica*, Hornem. Fl. Dan. xi. t. 1817 (1825). *P. pumila*, Hornem. ex Cham. & Schl. Linnaea, i. 514 (1826). *P. rotundifolia*, var. *grandiflora*, DC. Prodr. vii. 773 (1839). *Thelaia grandiflora*, Alefeld, Linnaea, xxviii. 68 (1856). Plant 5 to 16 (average 10) cm. high: leaf-blade 1 to 3 (average 2) cm. long: petals thick, white to crimson, 7.5 to 11 (average 8.7) mm. long: stamens 4 to 5.5 (average 5) mm. long; the anthers 1.7 to 2.3 (average 2) mm. long, muticous at base, the cells barely constricted above: style without annulate tips.—Greenland and Arctic America, south to Hopedale, Labrador.

Gray Herbarium.

NOTES ON THE FLORA OF BERKSHIRE COUNTY, MASSACHUSETTS.

Ralph Hoffmann.

The following records from Berkshire County, Massachusetts, may be of interest. They refer to plants which either have not hitherto been recorded from Massachusetts, or are known from very few stations in the state. These plants fall into more or less well-defined groups. In the cold sphagnum bogs and on the higher mountains occur northern plants which either reach or approach their southern limit for New England in Berkshire County. The western and southern river valleys, on the other hand, extend into New York or Connecticut, and on their well-drained slopes occur plants which for the most part have been prevented by the unbroken Hoosac Plateau from extending their range into central Massachusetts. Two or three plants are adventive but at least one is well-established.

Specimens of all the plants here recorded have been placed in the Herbarium of the New England Botanical Club. They have all been collected by me except in three instances where the plants were gathered by Mr. M. L. Fernald. I have to thank Mr. Fernald for his

usual generous assistance in identifying or verifying the specimens, and in the preparation of this article.

Aspidium aculeatum, Swartz, var. *Braunii*, Koch. In August, 1904, on revisiting the mountain brook which comes down the north side of Greylock, where I had previously found *Hydrophyllum Canadense*, I came across several plants of this fine fern. As far as I can discover, it has not hitherto been reported from Massachusetts.

Aspidium simulatum, Davenport. In September, 1904, I found this interesting fern not uncommon in the swampy woods bordering ponds in Becket and Otis. I have little doubt that on further search it will be found in similar situations in other parts of the county. Most of the New England records hitherto published have been from near the coast.

Potamogeton confervoides, Reichb. (*P. Tuckermani*, Robbins). Grows in Lake Undine on the Dome at an altitude of 2000 feet. The only other known station for Massachusetts is in Uxbridge, where it was collected by Robbins. It is found at high altitudes in New Hampshire and Vermont, and in several stations in New Jersey. It is recorded in Bennett's Plants of Rhode Island (p. 42) but no locality is given.

Eleocharis intermedia, Schultes. This species has been collected in northern Maine, in Vermont and in Salisbury, Connecticut but has not, so far as known, been reported for Massachusetts. I collected it in Pittsfield in 1902.

Scirpus lineatus, Michx. Collected at Stockbridge in 1902. It has been recorded from Middlebury and Bristol, Vermont (Rhodora, vi, 139), but not so far as I know from the other New England states.

Eriophorum polystachyon, L., var. *Vaillantii*, Duby. Mr. M. L. Fernald collected this cotton-grass at Sheffield in 1902. The attention of American botanists was first called to this variety by Mr. Fernald in Rhodora, iv. 82, where he records material collected by Dr. Fellows near Portland, Maine.

Carex aenea, Fernald. Occurs on rocky ledges on the Dome Sheffield, and in Glendale (vid. Rhodora, iv, 227).

Carex Bebbii, Olney. Occurs in bogs and low ground in Pittsfield, Glendale and Sheffield (vid. Rhodora, iv, 228.)

Carex intumescens, Rudge, var. *Fernaldii*, Bailey. Occurs not infrequently in wet woods.

Carex pauciflora, Lightf. I collected this sedge in September, 1904, in deep sphagnum at the head of Ward Pond in Otis. A sheet in the Dewey collection in the Gray Herbarium is marked Ashfield, and Dewey reported that it was collected in Ashfield and Hawley by Dr. J. Porter, Sill. Journ. x (1826), 42.

Chamaelirium Carolinianum, Willd. This plant was recorded in 1822 by Eaton (Manual of Botany, Ed. 3, p. 303) from Great Barrington, and by Dewey (Hist. of Berkshire p. 52) from Stockbridge. Several years ago a piece gathered in Stockbridge was sent to me, but was subsequently lost. This summer I collected it in Great Barrington.

Sisyrinchium mucronatum, Michx. Mr. Fernald collected this southern species in light sandy soil in Sheffield in 1902. It had been previously known only as far north as Connecticut.

Microstylis monophyllos, Lindl. There is no Massachusetts specimen of this orchid in the Gray Herbarium, but it is recorded as having been collected at Berlin, Spencer, and North Adams (Niles, Bog-trotting for Orchids p. 273), and it has been collected at Manchester, Vermont, and in New York State and northern Connecticut. I found a single plant in a cold spring hole in Stockbridge in August, 1904.

Arceuthobium pusillum, Peck. Grows on black spruce (*Picea nigra*) in peat bogs at the edge of a small pond in Becket, south of Yokum Pond, and at the head of Ward Pond in Otis. As I gathered it from a low spruce in September, I was struck in the face by a volley of seeds.

Oxalis filipes, Small. Mr. Fernald collected this southern species in Sheffield in June, 1902 (Rhodora, v, 34). It had previously been found at Northampton, Massachusetts, and Mr. Bissell has recorded it from Salisbury, Connecticut (Rhodora v, 33).

Ilex monticola, Gray, var. *mollis*, Britton. While collecting on the western side of the Dome in 1902, I found a strange Ilex growing commonly in shade in the moist woodland. Mr. Fernald has determined it as *Ilex monticola*, var. *mollis*. The type occurs on the Taconic and Catskill Mts. in New York, but the variety has not hitherto been reported north of Pennsylvania.

Epilobium hirsutum, L. Well established along the edge of a ditch in Lenox, forming a very ornamental border. The owners of the property inform me that it has been growing there for a long time

but they know nothing of its introduction. It has been collected at Portland, Maine, and in New Bedford, Massachusetts.

Epilobium lineare, Muhl., var. *oliganthum*, Trelease. Grows in a sphagnum bog in Sheffield. This northern form has been reported from Maine, New Hampshire and Vermont and has been collected by Mr. R. G. Leavitt in North Easton, Massachusetts.

Gaura biennis, L. In 1895 I collected a plant of Gaura in a mowing field in the Notch, North Adams, and in 1904 I found another plant in a dry field near the Housatonic River in Lee. In Bishop's Connecticut list (p. 39) it is reported as "becoming frequent."

Angelica hirsuta, Muhl. Grows in rocky woodland on the south slope of Monument Mountain in the town of Great Barrington. It is reported frequent in Connecticut but has not been recorded for Massachusetts.

Pyrola secunda, L., var. *pumila*, Gray. Occurs in Stockbridge in sphagnum near thickets of *Salix serissima*, Fernald. It has been previously reported from northern Maine, Vermont, New York and westward, but not, so far as I know, from Massachusetts.

Hydrophyllum Canadense, L. In Eaton's Manual of Botany (ed. 3, p. 311) this plant is recorded from Williamstown, but it was apparently not discovered by later collectors in that region. In 1899 I found it along a brook that flows down the northern side of Greylock, crosses the road from the Notch to Williamstown and flows into the Hoosac near Blackinton (vid. Deane, RHODORA, vi, 155). On a second visit this summer, I found the plant common in the rich soil bordering the brook. The plant should be looked for on other portions of the mountain.

Verbena angustifolia, Michx. Collected in Egremont in 1902. It has been previously recorded from South Hadley by Hitchcock and from Amherst by Clark (Cobb's Plants of Amherst, p. 16). It has recently been added to the Vermont list (RHODORA, vi, 142).

Veronica Anagallis, L. Occurs in wet brooks in Stockbridge and Sheffield. This western species is recorded from two stations in Vermont, and there is a specimen in the Gray Herbarium collected by Oakes in Ipswich, Massachusetts, but it has not, so far as is known, been again collected in Eastern Massachusetts.

Veronica Virginica, L. Grows in alluvial soil in Stockbridge and in Sheffield. It is common from Connecticut southward, but there are no specimens in the Gray Herbarium from Massachusetts or northward.

Plantago media, L. A single plant was found on a lawn in Lenox. It has previously been reported from Maine, Rhode Island, Ontario and New York.

Galium Labradoricum, Wiegand. In cold bogs throughout the county. This northern species has not hitherto been reported from western Massachusetts, but it has been recorded from northwestern Connecticut (Bissell, Rhodora, v, 33).

Galium trifidum, L. Occurs in Pittsfield and Sheffield and should be looked for in Connecticut. It has not, so far as I know, been previously reported from Massachusetts.

Symphoricarpos racemosus, Michx., var. *pauciflorus*, Robbins. Occurs on a dry hill in Sheffield. It grows in western Vermont, but has not hitherto been known from Massachusetts. The record for the state in Rhodora, vi, 55 is based on a specimen collected in Sheffield in 1902.

Solidago rigida, L. There is an extensive patch of this fine goldenrod on a dry hillside in Sheffield. It has been already recorded from South Hadley, Massachusetts, and it occurs in Connecticut.

Antennaria petaloidea, Fernald. This species is not uncommon in the county. It has already been recorded from Worcester County, Massachusetts (Harper, Rhodora, iii, 186).

Belmont, Massachusetts.

NOTES ON THE FLORA OF DAY MOUNTAIN, FRANKLIN COUNTY, MAINE.

C. H. Knowlton.

Day Mountain is a steep rocky ridge of land lying mostly in the eastern part of Avon, reaching down into Temple at the southern end, and into Strong on the eastern slope and northern end. It is nearly parallel with the Sandy River, and its general direction is roughly north and south. The ridge is well covered with deciduous trees except at the southern end. Steep and often perpendicular cliffs are very numerous, some of them two or three hundred feet high.

The entire ridge is over three miles long and is divided into two parts by a notch about one-third the distance from the northern end.

In this notch, shut in by the woods, is a beautiful pond several acres in extent. Aneroid readings taken by Mr. E. B. Chamberlain give the following corrected results: southern end, 2059 ft.; pond, 1369 ft.; northern end, 1601 ft.

From the pond a brook descends on the eastern side through a rocky gorge, 20 to 50 feet deep, to the Sandy River, 900 ft. below. About 500 feet of this descent is a splendid succession of waterfalls, which is at high water remarkably romantic and beautiful. The northern portion of the range seems to be composed of calcareous slate, while the southern end is granitic in structure.

Allied apparently to Day Mountain as regards flora, is a long range of hills stretching through Strong, New Vineyard and Industry, culminating in New Vineyard Mountain. This range I have not explored very thoroughly, and even Day Mountain itself, after seven visits, still seems to offer additional finds to the careful observer.

The following are the more notable plants of the region. Some of the ferns have been previously reported by Mr. H. W. Jewell (RHODORA, iv, 247).

Adiantum pedatum, L. Frequent along the base of the mountain, and in the southern towns of the county.

Aspidium aculeatum, Swartz, var. *Braunii*, Koch. Frequent in the gorge, and at the base. Exceedingly abundant on one of the New Vineyard hills.

Aspidium Goldianum, Hook. Wet woods near eastern base. It also grows in Farmington.

Aspidium spinulosum, Swartz, var. *dilatatum*, Hook. This grows luxuriantly on the southern end of the mountain, above 1600 feet. It is common as low as 1200 feet on all the other mountains of the county which I have explored.

Asplenium Trichomanes, L., is exceedingly common and luxuriant on dry shady ledges on the eastern side. This is its limit in this direction. It has been reported at Livermore, 30 miles away (*Mrs. H. K. Morrell*), also at Mt. Pisgah, Winthrop (*C. H. Knowlton and L. O. Eaton*).

Cystopteris bulbifera, Bernh. Wet woods at western base. Also in Farmington.

Phegopteris hexagonoptera, Fée, is abundant in a clearing near the southern end. It also grows at Farmington. This is well out of range, as the nearest stations are near the Kennebec.

Agropyrum caninum, R. & S. Dry rocks, common.

Asprella Hystrix, Willd., is very common in the dry rocky woods. It also grows in wet soil at Farmington and Strong.

Deschampsia flexuosa, Trin. Abundant on the bare portion of the top. It also grows on Bald Mountain, Perkins Plantation (*C. H. Knowlton and E. B. Chamberlain*).

Milium effusum, L. The only station reported in the State. It is very abundant, and is stoloniferous.

Oryzopsis melanocarpa, Muhl., is very common on dry ledges, and has previously been reported in Maine only from East Auburn.

Poa alsodes, Gray, and *Poa pratensis*, L. Occasional in open places on the summit of the higher part.

Habenaria bracteata, R. Br. Rather common in high woods.

Allium tricoccum, Ait. Very common. Also at Farmington.

Clematis verticillaris, DC. Dry woods, northern portion; the only station in the region (*E. B. Chamberlain and C. H. Knowlton.*)

Ranunculus abortivus, L., var. *eucyclus*, Fernald. Frequent in moist woods. Also at Farmington.

Arabis laevigata, Poir. Not common here, but abundant on one of the Strong hills across the river. Reported in Maine only from North Berwick.

Draba incana, L. Abundant on dry ledges, the only Maine station.

Erysimum cheiranthoides, L. One station in an opening half way up the mountain, as if introduced. No other station in the county.

Saxifraga Virginiensis, Michx., grows abundantly here and on the New Vineyard hills, but apparently not on the lower land nor farther north.

Ribes Cynosbati, L. Frequent.

Crataegus macracantha, Lodd. Frequent in open spaces.

Geum album, Gmelin. On dry rocks (*C. H. Knowlton and E. B. Chamberlain*). In the neighboring towns the white avens is *G. Virginianum*, L.

Geranium Robertianum, L. Very common in rocky woods. There is one station in Farmington, and it seems here to reach its northern limit in this direction.

Celastrus scandens, L. The only station known in the Sandy River valley. It grows along the Kennebec as far as Skowhegan, and at Livermore Falls on the Androscoggin.

Conioselinum Canadense, T. & G. One station near the river. Also in Madrid, 15 miles north.

Calamintha Clinopodium, Benth. Common in dry woods and copses throughout the southern towns of the county.

Arctium Lappa, L., var. *tomentosum*, Gray. One station in a clearing. A remarkably handsome form (*C. H. Knowlton and E. B. Chamberlain*).

Solidago macrophylla, Pursh. A little grows on the higher part of the mountain. Common on elevations above 1800 feet, and very abundant on Mount Blue, in the same town (Avon).

The flora of the pond is not appreciably different from that of similar sheets of water at ordinary elevations. The dryness of the cliffs seems to limit their flora to plants of one type, but I may later discover wet cliffs. The mountain is particularly interesting on account of its many southern species, mingled somewhat with northern plants.

Lexington, Massachusetts.

The Death of William Wendte.—On April 28th, 1904, William Wendte, an esteemed member of the New England Botanical Club, was killed by hostile natives in British East Africa. He was born August 28th, 1877, and his sudden death at the early age of twenty-seven is the saddest that has occurred in the history of the Club. Mr. Wendte, although for many years keenly interested in plants, was diffident in the matter of publication and left no printed papers to record his observations. He had traveled somewhat widely, making for instance a visit to the Hawaiian Islands some years ago. The plants which he collected there he generously deposited in the Gray Herbarium. He first attracted the notice of professional botanists by a series of minor but very discriminating criticisms on Gray's Manual, which he sent to the editors. He was elected to membership in the New England Botanical Club, February 3rd, 1899, and although living beyond the limit of resident membership he attended the meetings with great regularity.

An active member of the Society of Friends, he had planned to make an extended tour among the Friends' Industrial Missions throughout the world. He had reached the station of Kaimosi, about twenty miles northeast of Port Florence in British East Africa early in March. The hostile Nandi tribe had at that time become

so threatening as to oblige the government to send a detachment of soldiers to protect the Mission.

The exact manner of his death is unknown, but the presumption is that, venturing too far into the forest while making some botanical investigations, he was, in company with one of the guards, surprised and killed by a party of the Nandis.

William Wendte was one of the most self-sacrificing spirits I have ever known. Self with him was always a secondary consideration, and he was happiest when doing something for others. His highest ambition was to fit himself for a career of usefulness, and his death was a great loss. Possessed of an extraordinarily amiable character he made friends of all who came in contact with him, and he will be greatly missed by those who loved him.— G. E. D.

Asplenium ebeneum proliferum. — In a recent number of Rhodora[1] the writer described a specimen of the above fern which he found near Baltimore. A few days ago he came across another while preparing to mount an unusually fine plant. Instead of the two small, nearly entire fronds less than 4 mm. long, this plant had two fronds the largest of which was about 47 mm. long. The other frond was not yet fully developed, but it as well as the mature one was pinnate and in no way different from fronds of the same size on sporelings.

Soon after this eleven more specimens of this form were found during the Botanical Symposium at McCall's Ferry, Pa. Ten of these were found in a space six inches square. They were of all sizes from 50 mm. down to tiny plants with fronds 6 or 8 mm. in length. All of these had pinnate fronds, and none of them showed any approach to the simpler fronds of the plant first seen a year ago. Only one of them was peculiar in having the young plant at the extreme lower end of the stipe — practically in its axil — instead of at the point where the lowest pinna had been attached. All of them were on sterile fronds. From this and the dampness of the earth in which they grew it seems evident that the proliferous character is mainly caused by the accidental burying of the procumbent sterile fronds under circumstances most favorable to the decided tendency

[1] Rhodora, V, 272, 1903.

possessed by the fern in this direction. — C. E. Waters, Johns Hopkins University.

[Since the above was written two more specimens were found on the steep side of a railroad cut. Plainly this form is not rare but has merely been overlooked by collectors.— C. E. W.]

Juncus effusus, var. compactus in New Hampshire.— In Preliminary Lists of New England Plants,— XIII. Juncaceae (Rhodora, vi. 34) *Juncus effusus*, var. *compactus*, Lejeune & Courtois, is recorded only from Maine and Massachusetts. On 13 August, 1903, I found this plant, with *J. effusus*, L., beside a brook in East Andover, New Hampshire.— Mary A. Day, Gray Herbarium.

Plantago elongata in Massachusetts.— The published records for this plant in New England, do not extend the range of *Plantago elongata*, Pursh, further to the northeast than Greenwich, R. I. In the spring of 1901, however, Mr. J. F. Collins and the writer collected this plant in East Providence, R. I., and a few days latter in Seekonk, Massachusetts. The stations are extensive and the plant well established, so without doubt further search will result in extending the known range towards Cape Cod.— Edward B. Chamberlain, Washington, D. C.

Miss Eastman's New England Ferns and their common Allies[1] is a neat 12mo volume of 160 pages. The style is popular without being effusive and the information given is unusually accurate for a non-technical book. Even such recently published species and varieties as *Nephrodium pittsfordense* and *N. spinulosum*, var. *concordianum* are duly included, showing that the authoress has taken considerable pains to follow up the latest work on her subject. The nomenclature is in the main that of the sixth edition of Gray's Manual. In the present divergence of nomenclatorial practice it is well nigh impossible, however, to treat any considerable group consistently without creating some new combinations. Of these, the follow-

[1] Houghton, Mifflin & Co., Boston, July, 1904, $1.25.

ing have been noticed in a brief examination of Miss Eastman's book. *Dryopteris spinulosum*, var. *concordianum*, Eastman, and *Aspidium spinulosum*, var. *concordianum*, Eastman (=*Nephrodium spinulosum*, var. *concordianum*, Davenport), *Aspidium marginale*, forma *Davenportii*, Eastman (without synonymy but figured and doubtless relating to *Nephrodium marginale*, forma *Davenportii*, Floyd), and *Aspidium pittsfordense*, Eastman (*Dryopteris pittsfordensis*, Slosson, *Nephrodium pittsfordense*, Davenp.). The introduction of such new binomials and trinomials in popular works, and unaccompanied by complete synonymic citation, although sometimes difficult to avoid, is always unfortunate. When such names are so published, however, the author will do well to distinguish them clearly either by the use of different type (preferably full face) or still better by employing the customary abbreviations, n. sp., n. var., n. comb., or n. nom. The importance of thus clearly indicating new names is little appreciated by popular authors and, indeed, by some technical writers as well. Yet no small amount of our present nomenclatorial confusion has arisen through negligence in just such matters, a form of carelessness or possibly in some cases a false modesty, which has often led to the oversight of names until long after others have become established.

Botrychium tenebrosum, A. A. Eaton, is appended to *B. matricariaefolium*. We believe it to be rather a shade form of *B. simplex*, from which, in fact, it seems to possess no clearly marked distinction, the position and emarginate nature of the sterile frond being highly variable even in plants of the same colony.

The chief fern-allies are also described and figured. It may be noted that the plant illustrated as *Lycopodium complanatum* is Mr. Fernald's well marked variety *flabelliforme*.

The illustrations are half-tone plates, attractive and sufficiently clear for recognition. But although a very fine screen has been used and the printing of the plates is irreproachable the process is not entirely satisfactory for the objects represented. The venation, for instance, rarely comes out with distinctness. — B. L. R.

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HYBRIDISM IN THE GENUS VIOLA.

EZRA BRAINERD.

(Plate 58.)

At the close of my "Notes on New England Violets" in RHODORA, vi. 17, I ventured to suggest that the newly recognized species of blue stemless violets occasionally produced hybrids. Another season of diligent study of this problem, both in the field and in herbaria, has brought to light numerous facts that confirm this theory. Indeed the evidence, when taken in all its detail, seems to place the conclusion beyond any reasonable doubt. The object of the present paper is to report some of these facts and to present the evidence.

There is a widespread reluctance on the part of American botanists to regard an intergrading form as a result of natural hybridism. The systematists of the Old World have far less prejudice, perhaps because they have studied for a longer time and with more care and thoroughness the behavior of their species in the field. The burden of proof is, of course, on the advocates of the supposed hybrid; but that proof should be considered with candor, and not thrust aside from a preconception that hybridism is most improbable. For if hybrids ever occur in a state of nature, and few will deny it altogether, we should expect them to occur among the twelve or fifteen segregates of the old Viola cucullata-sagittata group. These segregates are so closely allied, that Dr. Gray, who was acquainted with most of the extreme types, recognized only two polymorphous species with intergradient forms, and that even to-day after prolonged study experts are widely apart as to the delimitation of species. The floral structure indicates that the petaliferous flowers are incapable of self-fertiliza-

tion; and when colonies of two species grow closely intermingled, interbreeding is what might be reasonably anticipated.

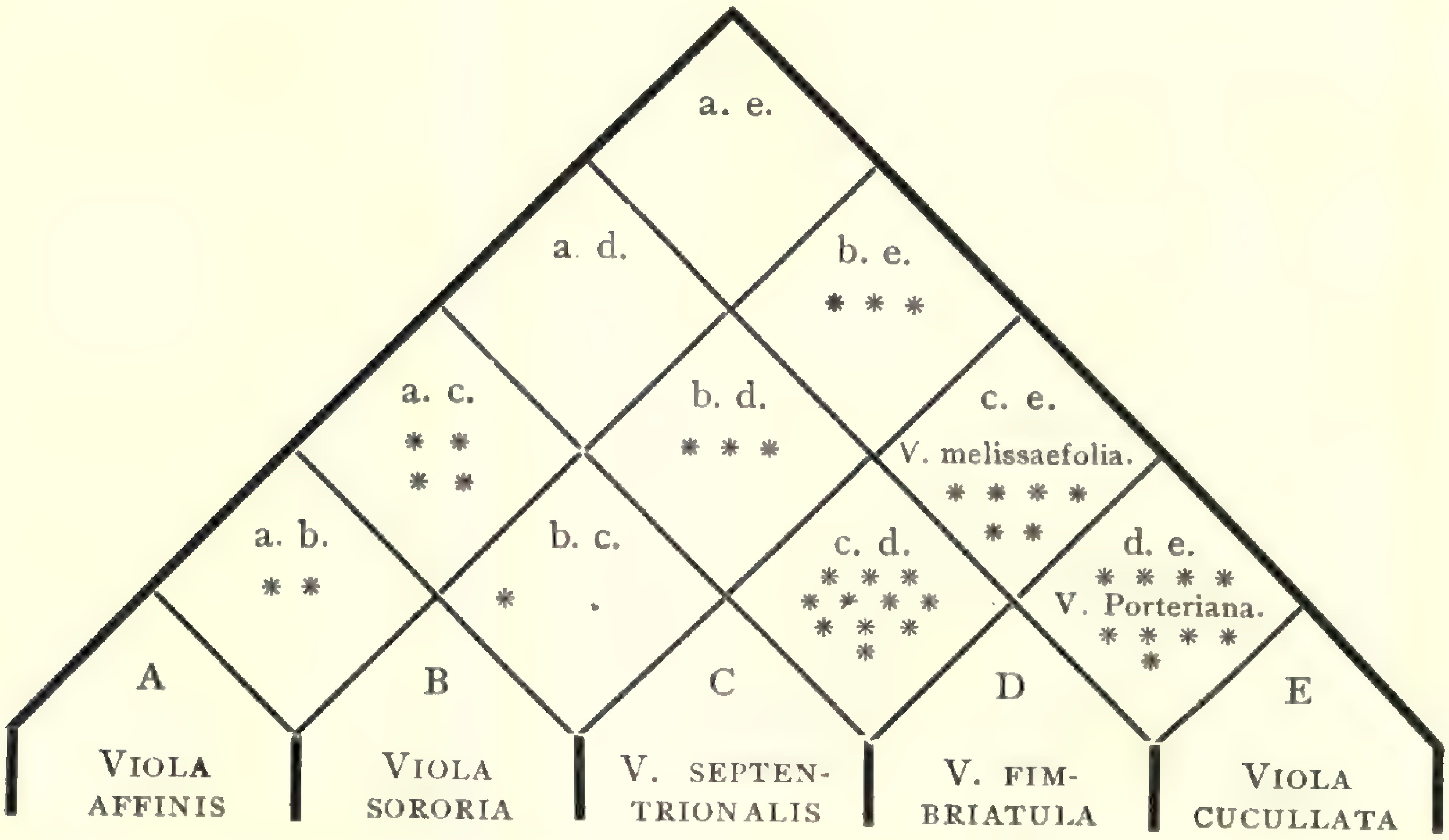
In the present paper I shall restrict the discussion to the behavior of the five species of this group that are most abundant in Western Vermont, and that have naturally been studied in the field with most assiduity. I name them with their contrasting characters in the following table:

	V. affinis[1]	V. sororia	V. septentrionalis	V. fimbriatula	V. cucullata
Plants:	glabrous	pubescent			glabrous
Leaves:	cordate-acuminate	broadly cordate-ovate		ovate-oblong	cordate
Spurred Petal:	with few or no hairs		bearded		beardless
Cleistogamous Peduncles:	horizontal or decumbent			erect or ascending	
Cleistogamous Flowers:	ovoid-acum ate		sagittate		subulate
Cleistogamous Capsules:	oblong usually m ttled with purple		subglobose	oblong always green	
Cl'st. Sepals:	lanceolate	ovate-lanceolate		narrowly lanceolate	
Auricles:	short, inconspicuous		long, spreading, hispidulous		long, not spreading

The number of possible combinations in pairs of these five species will be found to be ten. In general, if n represent the number of species, and N the number of possible pairs, we have the formula, $N = \frac{1}{2} n (n - 1)$. That is, among twelve species of Viola there would be 66 possible ways of hybridizing. If there were twenty species of Crataegus so nearly allied that a cross could be effected between any two of them we might have possibly 190 hybrids.

[1] *V. venustula*, Greene, is found not to be specifically distinct from *V. affinis*, Le Conte, as understood by Prof. Greene, or from *V. obliqua*, as interpreted by Mr. Pollard in the Britton Manual.

This may be represented graphically by writing the five species, as above, in equal spaces, and then drawing from the extremities of these spaces straight lines obliquely upward to the right and to the left. There will thus be formed ten squares, each of which may represent the hybrid that might arise from crossing the two species between the sides of the square produced downward. Thus, in the diagram below, the square marked "a. c" would represent the form obtained by crossing A and C; i. e., *V. affinis* × *septentrionalis*.



Asterisks in the several squares indicate the number of different stations in which the hybrid is believed to have been found; from which it would appear, if my conclusions are sustained, that out of ten possible hybrids eight have actually appeared, and in most cases more often than once. A somewhat detailed account of these eight hybrids, of the associated plants, and of the circumstances attending their discovery is herewith presented.

1. Viola septentrionalis × fimbriatula. A deserted clearing on the mountain side above East Middlebury, partly covered with blackberry bushes and young pines, has been a favorite station for *V. septentrionalis*; and in the more open spaces were to be found also numerous plants of *V. fimbriatula*. Here in the spring of 1902 I noticed in a tract of about four square rods a number of plants that in leaf-outline and in size and color of flowers were quite intermediate between the two species just named. The cleistogamous flowers and

fruit, which were carefully studied the following season, presented the same intermediate characters; being greenish in general color like the one parent, but showing in varying degrees blotches and dots of purple like the other parent. I have again watched the plants, in their wild state and under cultivation, during the past season, and in all their stages of growth they have presented no characters not found in one or the other of the associated species, with one exception — the plants were nearly sterile. The capsules contained on the average only one eighth the normal number of seeds; though along with these seeds could be seen on each of the three valves from ten to fifteen aborted ovules.

Quite similar plants were discovered in August, 1903, in a rocky pasture near the village of Middlebury. The pasture has been in use for over a century; but the thin uneven soil of the ledges has never been plowed, and is more or less overgrown with weeds and shrubs. For a stretch of a hundred rods along this tract are to be seen colonies of *V. septentrionalis* and of *V. fimbriatula* growing intermingled. With them are found twenty or thirty plants that are so distinct from either that by the leaf or the flower they can be told at a distance; and yet on examination they are seen to be exactly intermediate. In the late summer they produce numerous cleistogamous flowers and fruit, but nine-tenths of the ovules remain unfertilized. One of these plants is figured in plate 58, in which may be seen the intermediate character of the leaf, and the dwarfed, almost sterile, condition of the capsule as compared with the parent capsules.

The hybrid has also turned up in two other stations in the vicinity of Middlebury. I have noted also the following dried specimens, which I regard as identical with the Vermont plants: — "Sandy open woods," Orono, Me., July 3, 1897 (*M. L. Fernald*, N. E. Bot. Club Hb.), June 4, 1898, no. 2256, and Sept. 5 & 16, 1898, no. 2706 (Gray Hb.); "Dry open woods," Cape Elizabeth, Me., May 11, 1902 (*M. L. Fernald*, Gray Hb.), in both stations the parent forms also were found; "Dry open hillsides near Gap Mt.," Jaffrey, N. H., June 13, 1898 (*B. L. Robinson*, no. 658, N. E. Club Hb.); "Glade in dry pine woods," Seabrook, N. H., May 29 & July 2, 1899 (*A. A. Eaton*, Nat'l Hb.); near Winchendon, Mass., Sept. 3, 1895 (Nat'l Hb.), *V. fimbriatula* is on the same sheet; "Dry soil, pine woods," Amesbury, Mass., June 24, 1899 (*A. A. Eaton*, Nat'l Hb.), *V. septentrionalis* was collected by him at same time and place.

Last June I received among other plants three specimens of what seemed to be this hybrid from Mr. L. W. Watson of Charlottetown, Prince Edward Island. But the trouble was that though *V. septentrionalis* was common, *V. fimbriatula* had never been reported from that region, and was not known to occur in the Province of Quebec, or in northern Maine and New Brunswick. At my request Mr. Watson kindly revisited the station, and succeeded in finding there excellent specimens of *V. fimbriatula*. We are taught in inductive logic that one of the best possible verifications of an hypothesis is its ability to anticipate the discovery of facts not before observed.

2. Viola fimbriatula × cucullata. This I found in Salisbury, Vt., along a trout brook that crossed a sterile pasture at the base of the mountains. Along the edge of the water and in moist hollows *V. cucullata* was common, with short petioles and peduncles when growing in the open, and with long petioles and peduncles when growing in the shade of alders. On the drier knolls back from the brook were colonies of *V. fimbriatula*. Beside them I observed last May plants with wider leaves and larger less decidedly purple flowers marked with a ring of dark-blue at the center. They were examined again in August, and some eight of the plants removed to the garden; the cleistogamous flowers and fruit of autumn, as well as the foliage and the vernal flowers, revealed a plant midway between the two familiar species with which it grew; but no capsule ripened more than four seeds.

I also collected a similar plant in Cheshire, Berkshire Co., Mass., Aug. 26, 1903. *V. cucullata* was found near by, and *V. fimbriatula* is a common plant of the region. The specimen has two green fresh cleistogamous flowers, three somewhat more advanced but brown and withered as though entirely unfertilized, and one green capsule shorter than the sepals and containing only three seeds but numerous aborted ovules.

Just such a plant as these is described and figured by Mr. C. L. Pollard in the Bulletin of the Torrey Club (xxiv. 404) as *Viola Porteriana*. It was collected at Bushkill Falls, Pa., May 31, 1897. Mr. Pollard in the article states that an abundance of *V. fimbriatula* was collected on the same excursion; and I have noted in the National Herbarium and the Bronx Park Herbarium specimens of *V. cucullata*, collected at the same place and time, one by Mr. Pollard and one by Dr. Britton. Profr. Greene (Pitt. iii. 256) undertakes

to identify this with *V. dentata*, Pursh, and Mr. Pollard has accepted this name for his plant in the Britton Manual. Whether there is sufficient warrant for this identification or not, I am confident that the Bushkill plant will prove to be a not infrequent hybrid between *V. cucullata* and *V. fimbriatula*.

I would cite as further instances the following specimens: Dry-ish hillside in open woods, Cumberland, Me., June 27, 1902, (*E. B. Chamberlain*, N. E. Club Hb.); Jaffrey, N. H., July 25, 1896, (*Walter Deane*, N. E. Club Hb.); Jaffrey, N. H., July 4, 1897, (*B. L. Robinson*, no. 657 Gray Hb.), "Transitional form between *V. fimbriatula* and (?) *V. cucullata*"; Dry woodland, Indian woods, East Lyme, Ct., June 19, 1900, (*C. B. Graves*, 119, Gray Hb. and Hb. E. B.); Granby, Ct., July 10, 1903, (*C. E. Bissell*, no. 8299); Stafford, Ct., Aug. 26, 1903 (*C. E. Bissell*, no. 8269).

3. Viola sororia × fimbriatula. This plant first attracted my attention in May, 1902, growing at the base of a ledge in a neglected pasture. The foliage and the color of the flowers at once distinguished it from the plants of *V. fimbriatula* with which it was intermingled. At the same time its narrow leaves and prominent stipules separated it from *V. sororia* which grew about twenty feet distant. I took but few specimens, as the colony was not a large one; some of these I sent to Mr. Pollard, querying if it might not be a hybrid. He considered it more probably a new species. I have frequently visited the station since, and find that the fruit shows unmistakable marks of *V. sororia*. The plant much resembles *V. fimbriatula × septentrionalis*; but the less ciliate sepals and their smaller appressed auricles serve to distinguish it. It is less sterile than most hybrids, but I have never found a capsule that contained more than half the normal number of seeds.

I place with this specimens collected in Alstead, N. H., July 15, 1899, by Mr. Fernald (no. 335, Gray Hb. & N. E. Club Hb.). I would also call attention to a quite similar plant collected by Mr. Witmer Stone at Media, Pa. (no. 5147) and at Chadd's Ford, Pa., July 5, 1903 (no. 5150), and published by him as *V. fimbriatula aberrans* (Proceed. Acad. Natural Sci. Philad., Oct., 1903, p. 683, Pl. xxxvii, fig. 4–6.) Mr. Stone writes, regarding his 5150, "I think *V. papilionacea* did grow in the vicinity; *V. fimbriatula* was there in abundance; and my surmise was that my plants were hybrids between the two." I refer to this plant here, as *V. sororia* and *V. papilionacea*

are so closely allied that they might without much impropriety be regarded as phases of one species.

4. Viola affinis × septentrionalis.— My first and most important station for this is Knight's Island in northern Lake Champlain, on which I have camped in summer for many years, and whose two hundred acres I have thoroughly explored. I never observed there but two species of blue stemless violets, *V. affinis* and *V. septentrionalis*; but these grow in abundance in moist thickets of arborvitae, under old appletrees and in moist meadow-land. While studying these species critically in August, 1903, I was perplexed to find several specimens that I could not satisfactorily place in either category. The leaves were too acuminate and narrow for *V. septentrionalis*, but not sufficiently so for *V. affinis*; there was a slight pubescence on the petiole and on the margin of the leaf and on the auricles of the sepals, such as *V. affinis* never had, but not enough pubescence for *V. septentrionalis.* What added to my embarrassment was the fact that I was totally unable to find plump, full grown capsules, though there were plenty of small seemingly immature ones. I carefully weeded and mulched the large clump that I had left growing, and waited for further developments. I visited the station last May and frequently during the following July, and became thoroughly satisfied that the plant was a hybrid between the two species so common on the Island.

A further incident is of interest, as showing that the seeds of this hybrid, though few, are fertile and will produce vigorous plants. When I finally on July 24th dug up the clump for herbarium specimens, I found thirty-three seedlings closely clustered about its roots, bearing each only one or two leaves. These seedlings I carried home and planted; they have all lived and flourished. Many of them produced in September cleistògamous capsules; but all of the capsules show the same paucity of seeds as those on the mother plant.

I found several specimens of this hybrid last May in an open grove of sugar maples near Middlebury. The ground was gay with the large violet flowers of *V. septentrionalis*, and in the moister hollows of the ledge there was an almost equal profusion of *V. affinis.* Careful search revealed intermediate forms. One of these transferred to the garden has produced more than fifty capsules, all showing the characteristic infertility of the hybrid.

I have collected a few specimens of the same thing at a third

station, growing with both parents. But I have failed to discover the plant in any of our large herbaria. However, the fact that *V. septentrionalis* is unknown south of New England, and that *V. affinis* is apparently wanting in eastern New England, would seem to account sufficiently for the non-appearance of the hybrid outside of the Champlain Valley.

5. Viola septentrionalis × cucullata.— This is another hybrid necessarily restricted to northern regions. I have found single plants at three widely separated stations, always associated with the parent forms. At one of these stations near Silver Lake, Leicester, Vt., I observed in a large assemblage of *V. cucullata* one plant with broad-petaled violet flowers, strikingly distinct from the other flowers. An examination of the leaves showed decided traces of pubescence. I transferred the plant to the garden, where it has since produced apetalous flowers and fruit in abundance. The long somewhat hispidulous sepals display qualities inherited from both parents, but the capsule bears only from one to six seeds. Lest it may be surmised that the moving of these plants has caused this sterility, I would here state that I have the past season transplanted several individuals of each of the five species under discussion when they were in flower and later, that they have afterward fruited in abundance, and that I have never found upon them a capsule that was not plump and crowded with 40–70 seeds. Violets are transplanted with the greatest ease, if set in moist shaded soil, and grow luxuriantly under proper culture.

I received last May from Mr. Watson of Charlottetown, P. E. I., live specimens of *V. melissaefolia*, Greene (Pitt. v. 103) from the type station. As these plants developed in the summer, they turned out to be a good match for the Silver Lake plant that I had also under cultivation. The leaves had the same scanty finely appressed pubescence and ciliation, the petioles the same sparse villose hairs, the capsules the same narrow slightly hispidulous sepals and the same paucity of seeds. The closing sentence of Prof. Greene's note shows that the plant suggested to his mind both of the species here regarded as the parent forms.

I also place here without much hesitation a remarkably robust plant, collected only in petaliferous flower: "Sandy interval, Fort Kent, Me., June 16, 1898" (*M. L. Fernald*, no. 2254, Gray Hb. and N. E. Club Hb.). It has peduncles somewhat longer than the

minutely ciliate and slightly pubescent leaves; the cleistogamous flower is nearly as long and slender as in *V. cucullata*, but with slightly hispidulous auricles, somewhat as in *V. septentrionalis*.

Dr. James Fletcher, the botanist of the Dominion Experimental Farm at Ottawa, who has given much expert study to the violets of Canada, showed me when I visited him last September, a potted plant of this hybrid that came from St. Stephen, New Brunswick. A fine photograph taken last May shows over thirty large flowers on slightly hairy peduncles but little taller than the leaves, and confirms Dr. Fletcher's statement that it is one of the most beautiful of our violets. Mr. Watson and Mr. Fernald have both spoken in similar praise of their respective finds. It is a promising plant that merits the attention of the florist.

6. V. SORORIA × SEPTENTRIONALIS. I have not as yet succeeded in finding this hybrid in more than one station. This was in a thicket on a narrow terrace of fine silt bordering the river above Middlebury. The plants were growing with a large colony of nearly glabrous *V. sororia*, a form that might pass as *V. papilionacea*. A few rods farther up the stream was to be seen *V. septentrionalis*. The hybrid is distinguished from the plants with which it grew by the narrower leaves, finer pubescence, somewhat spreading auricles of the sepals, and the uniformly stunted and often distorted capsules containing mostly aborted ovules. The plants have not been seen in flower, and require further study.

7. V. AFFINIS × SORORIA. This has turned up in two stations, fifty miles apart. The first was on a narrow wooded island of four or five acres, in northern Lake Champlain. On the north end of the island is a large lagoon of stagnant water made by the joining of two sand-bars driven northward by wave-action from the two sides of the island. In the moist leaf mould on the borders of this pool are to be seen luxuriant specimens of *V. affinis*, some plants in May bearing each as many as forty petaliferous flowers. A little farther back in drier and more shaded spots are colonies of *V. sororia*; and these are the only two species of blue stemless violets to be seen on the island. Not far from them I discovered, Aug. 6, 1903, a colony of plants intermediate in foliage and pubescence. At the time I did not suspect its relationship with the other forms; I fancied when I noticed its scanty pubescence, that I might have found the long sought for *V. papilionacea*, and destroyed most of the plants in a

vain effort to get good fruit. The capsules all seemed but half-grown; though as it afterward appeared many of them contained ripe seed. Subsequent study of the plants preserved leaves no doubt in my mind that they are the result of a cross between the two associated species.

The other station for this hybrid is in my own dooryard. For many years I had admired a large patch of blue violets growing in moist loam under a large appletree. The plants were cespitose and numerous, and flowered profusely in May, presenting almost a continuous sheet of blue. Until recently they have been to me a great puzzle; I could not satisfactorily place them with any of the common species of the region. I concluded finally "it must be" *V. papilionacea*, an opinion that both Mr. Pollard and Dr. Robinson were disposed to confirm. But the leaves were too small and too pointed, the sepals too attenuate, the capsules too small and purple, when I compared them with specimens of *V. papilionacea* from the Middle States. Further investigation the past season solves the problem. I find (1) several plants that are undoubtedly *V. sororia*, bearing pale-blue flowers, large broad pubescent leaves, large oblong capsules with ovate-lanceolate sepals and abundant seeds; (2) more numerous specimens of genuine *V. affinis*, bearing smaller acuminate perfectly glabrous leaves, violet-blue flowers, small, short oblong capsules with lanceolate sepals and abundant seeds; (3) still more numerous plants, bearing leaves intermediate in outline, size and pubescence, and capsules that are small often one-sided and relatively infertile. The average number of seeds in ten capsules (all that were mature on one plant), was six and two tenths.

8. V. sororia × cucullata. On May 20, 1903, in Cheshire, Mass., (alt. 1200 ft.), I found a large clump of a strange violet, bearing numerous large blue flowers, growing in moist rich soil under a wild appletree along the roadside. The plant was nearly glabrous, the peduncles somewhat longer than the leaves, the sepals lanceolate. I was at a loss whether to call it *V. cucullata* or *V. sororia*; and hoping to remove the perplexity by getting mature fruit, I revisited the station the following August. But in this I was for the time being disappointed; for the capsules, though numerous, were all small, imperfect and few-seeded. The long auricles and erect peduncles pointed to *V. cucullata*, while the pubescence of the petioles, more manifest than in May, pointed to

V. sororia. Apparently my troublesome plant is a cross between these two species, both of which were growing in the immediate vicinity.

The same hybrid was found when in flower last spring in two other stations, associated with the parents. In both cases plants were transferred to the garden, and developed characters during the autumn that are in perfect accord with their supposed origin.

I have gone, somewhat tediously I fear, into these details of personal experience, as I have felt that I could in no other way adequately present the great mass of circumstantial evidence that to my mind establishes the theory of occasional hybridism in this group of plants. And this evidence, as the instances increase in number, has a cumulative force. A single instance of a plant nearly sterile and quite intermediate between two associated species might not bring conviction as to its hybrid origin. But when forty or more such cases are observed, always under similar circumstances, the evidence has a logical force well nigh irresistible.

Along the southern New England coast and farther south are found at least six other species of Viola in the same group with the five under discussion. Are these six species equally guilty of hybridism with each other, and with any of the five here discussed with which they may chance to associate? This is a question so grave and so complicated as to require a separate paper for its discussion.

Middlebury College.

Explanation of Plate 58. — *Viola fimbriatula* × *septentrionalis*: *a*, autumnal state showing open capsule with seven seeds and numerous aborted ovules. *V. fimbriatula*, J. E. Smith: *b*, leaf; *c*, mature capsule; *d*, same open, showing normal number of seeds. *V. septentrionalis*, Greene: *e*, leaf; *f*, mature capsule; *g*, same open, showing normal number of seeds.

A NEW SPECIES OF BLACKBERRY.

W. H. Blanchard.

I wish to report a new blackberry which I think is sufficiently common and wide-spread, as well as constant in its characteristics, to merit a name and take its place with the five or six best marked North American species. Probably every botanist in New England

can find it on his or her own botanizing ground, for I have found it abundant or common in five of the New England states which I have visited. From the common high blackberry (*Rubus nigrobaccus*, Bailey) it is readily distinguished by the entire absence of glandular pubescence. It belongs to a group of forms hitherto generally referred to *R. argutus*, Link, and *R. Randii*, Bailey. The type of the former of these species is still preserved in the Royal Botanical Museum at Berlin, and I have been able to examine an excellent tracing of it, now in the Gray Herbarium. It has decidedly narrower leaflets which are cuneate or obtusely pointed at the base but not in the least cordate. In *R. Randii*, likewise, the leaflets are narrower than in the plant here described and not at all cordate. *R. Randii* is furthermore a much weaker plant scarcely or not at all armed, and has a small flower and a small, dry, and seedy fruit. The type specimen is now in the Gray Herbarium.

The new species is readily distinguishable by its broad, thin pubescent leaves, by its nearly round stem from two to four feet high, the canes very often bending over as in the Black Raspberry, and by a noticeable resemblance to the common running blackberry, *R. villosus*, Ait. It may be named and characterized as follows: —

R. recurvans, n. sp. Plant softly and copiously pubescent but wholly destitute of glandular hairs of any kind.

New canes. Stem glabrous, reddish on the upper side, nearly cylindrical or with five rounded or rarely furrowed faces. Prickles set in lines over the angles of the pentagonal pith, straight with a slight backward slant, rather strong, one eighth inch long above the enlarged basal part, about five to an inch of stem but varying considerably in number and strength. Leaves large (sometimes ten inches broad), all 3-foliolate or the upper often 5-foliolate. Leaflets nearly smooth above with thick straight pubescence beneath, yellowish green, coarsely and doubly serrate-dentate, generally thin; the middle one broadly ovate taper-pointed, about three-fourths as wide as long cordate or subcordate, its stalk an inch in length; side leaflets oval, cuneate at each end and nearly twice as long as wide, their stalks one fourth inch long; basal leaflets oval, twice as long as wide, wedge-shaped at each end, sessile. Petioles furrowed and glabrous, the petiolules pubescent, both armed with hooked prickles.

Old canes. More or less densely pubescent on all parts, except the upper surface of the leaves; some parts nearly woolly. Leaves more deeply and sharply serrate-dentate than those of the new canes and of a lighter yellowish green. Stem nearly round with prickles intact, the main axis dying back to a considerable extent during the winter. Secondary growth polymorphous and difficult to describe, —

leaf-branches, leafy inflorescences and naked inflorescences occurring on all parts of the main axis and often all three kinds growing from the same old-leaf axil, the leaves often all unifoliate and of all sizes and shapes. Flowers rather showy, one and one-eighth inches broad. Petals noticeably broad, one-half inch long, one-fourth to five-sixteenths of an inch wide, white. The most noticeable form of fruiting branch about six inches long, with one trifoliolate leaf, and one or two oval unifoliolate leaves subtending the rather closely-bunched four to six fruits. Fruit of medium size, cylindrical about one-half inch high and rather longer than thick, maturing *very early*. Drupelets larger than those of *R. nigrobaccus*, Bailey, black, pulpy, sweet, but lacking the aromatic taste characteristic of *R. nigrobaccus*.

Growing chiefly in open sunny places and ranging widely over the New England States, being frequent as observed by the writer in Southern Vermont, Southern New Hampshire, Western Massachusetts, Southwestern Maine, and Central Connecticut. As examples collected by others may be cited the plant of Mr. M. L. Fernald, collected at Gilsum, New Hampshire, July 23, 1899, no. 22 (hb. Gray), and plants in the herbariums of Messrs. Luman Andrews and C. H. Bissell collected in 1903 at Southington, Connecticut; also of Pres. E. Brainard collected at Middlebury, Vermont. The range is likely to extend north, west and perhaps south.

This blackberry is frequently erect with canes sometimes five feet high and seven or eight feet long and a half inch in diameter at the base, being two to four feet high generally, but it is more often rather straggling, with the canes recurving and prolonged on the ground when they frequently tip. The new canes considerably overtop and often hide from view the fruiting ones, which on small plants are close to the ground. The species often bears a fine crop of berries but they are so early that they are overlooked, since they are nearly gone when most of our species are at their best.

I have watched the species for several years over a wide range and find it easy to recognize. I have, it is true, found a few plants which deviate somewhat from the above description, though they probably belong to this species. Some of them are glabrous with thin leaves, others glabrous with thick leaves, the former having long, slender, recurving stems, generally tipping.

WESTMINSTER, VERMONT.

A NEW VIOLET FROM NEW ENGLAND.

Homer D. House.

(Plate 59.)

Although the described species of Violets have increased greatly within the past decade, it is perhaps more the result of careful study of the features that constitute specific differences in the violets than it is the segregation of already described species. At first glance the peculiar violet described below would appear related to the *Sagittata* group, but a study of several sheets from various localities shows that its affinities lie in an entirely different direction.

Viola Novae-Angliae, sp. nov. Acaulescent, from slender, ascending rootstocks: earliest leaves ovate or triangular-ovate, cordate, crenate, rounded or obtuse at the apex, 1–2 cm. long, on petioles 2–4 cm. long; later leaf-blades thin in texture, triangular-lanceolate, 4–6 cm. long, 1.5–2.5 cm. broad at the base, tapering to an acute apex, the base subtruncate to cordate, margin crenate-dentate at the base, obscurely and distantly crenate toward the apex; dark green and nearly glabrous above, paler and more or less pubescent beneath, especially on the veins; petioles 7–15 cm. long, pubescent with white floccose hairs or glabrate in age: flowering scapes 6–10 cm. long, not surpassing the leaves, bibracteolate below the middle, bractlets ovate with subulate tips 1 mm. long: sepals oblong-lanceolate, 7–8 mm. long, glabrous, obtuse, 3-nerved, the basal auricle less than 1 mm. long, rounded or truncate: petals narrowly oblong, 12–15 mm. long, deep purple-blue, spreading, the lateral and lower ones densely villous with white hairs, the lower one veined with dark purple: cleistogamous flowers short-sagittate and blunt, 3–4 mm. long on short horizontal peduncles, 15–25 mm. long, their capsules subglobose, about 6 mm. long, or less.

Sandy shore, Fort Kent, Aroostook county, Maine, *M. L. Fernald*, no. 2245, June 15, 1898. The type is sheet no. 338,658 in the National Herbarium.

The systematic position of this species is difficult to decide. By its small cleistogamous flowers on horizontal peduncles it is related to *V. affinis* LeConte. Its leaf-shape is somewhat suggestive of *V. emarginata* (Nutt.) LeConte, but its dense pubescence removes it from close relation with either of these species.

In addition to the type mentioned above the following specimens may be referred here.

St. Francis, Aroostook Co., Maine, *Fernald*, no. 2244, June 18, 1898.

Blue Hill Reservation, near Boston, Mass., *Charles L. Pollard*, Aug. 24, 1898.

Bridgeport, Conn., *E. H. Eames*, May 19, 1895.

Another sheet collected by Mr. Fernald at Orono, Penobscot Co., Maine (no. 2256) agrees with the type in all characters except the shape of the leaf blades, which are more ovate and cordate in outline and more densely pubescent.

WASHINGTON, D. C.

DALIBARDA REPENS NEAR BOSTON. — Although the dainty little plant, *Dalibarda repens*, L., may not be in reality far out of its course, yet it seems to have aroused much interest among botanists in this section who have recently learned of its being well-established within thirteen miles of Boston. Deep in the woods of Holbrook, far from dwelling houses, it covers an area of fully a quarter of a mile in extent, usually being scattered about here and there, but occasionally forming large mats, which are easily distinguishable from a distance. Several hundred plants were in blossom at the time I first visited the place with my mother, Mrs. G. L. Grinnell, who first found this little colony. The plants border a swamp but seem to keep up just out of the wet. In company with the *Dalibarda* I noticed cinnamon ferns, mountain laurel, low blackberry vines, and Lycopodiums. There is no doubt that the *Dalibarda repens*, L., is as perfectly indigenous as any of its neighbors mentioned, for the plants are widely scattered and show evidence of long residence.— ALICE G. CLARK, East Weymouth, Massachusetts.

MIMULUS MOSCHATUS IN MASSACHUSETTS.— While driving through Warwick, Franklin County, in August, 1902, I met for the first time in Massachusetts the Musk Plant (*Mimulus moschatus*, Douglas), a little traveler from the Pacific Coast. Its comely yellow corolla smiled up from a tangle of taller plants that crowded about a spring in a bank by the roadside. The little wayfarer seemed to be thoroughly at home in its narrow quarters in the very course of the trickling water. The slender viscid stems bore only a few flowers. As I picked one

I detected a slight musky odor, and again got just a faint whiff of musk when at my journey's end I looked at the carefully cherished specimen only to find a black and wilted plant without corolla. Taking the same drive in August, 1904, I looked eagerly to see if this apparently tender plant had survived the rigors of two New England winters. I found the way-side spring and caught the gleam of small yellow flowers near it. *Mimulus moschatus* was in fine condition; its ascending stems were well filled with buds and blossoms, while other creeping stems by rooting at their joints in the springy soil of the bank, had extended the colony to the roadside, where, in the black ooze of the gutter, the plant had also established itself. So far as I have learned the species has been hitherto reported from only two of the New England states, Vermont and Connecticut.— M. E. Ward, Lynn, Massachusetts.

Subularia at East Andover, New Hampshire.— The writer, while fishing in Highland Lake, recently discovered growing on the sandy bottom a small plant, which on investigation seemed to be the little awlwort, *Subularia aquatica*, L. Knowing this plant to be recorded from only two stations in New Hampshire, and wishing to remove any question regarding its occurrence here, the writer sent specimens to Mr. M. L. Fernald of the Gray Herbarium, who verified the identification. As it is always of interest to the plant-lover to learn of a new station for a rare plant, the writer takes pleasure in informing the readers of Rhodora of this station. On investigation the plant was found growing abundantly in suitable places all around the Lake.— George W. Holt, East Andover, New Hampshire.

Vol. 6, no. 70, including pages 197 to 212 was issued 29 October, 1904.

F. Schuyler Mathews del.

VIOLA FIMBRIATULA × SEPTENTRIONALIS (fig. a).
V. FIMBRIATULA, J. E. Sm. (figs. b, c, d). V. SEPTENTRIONALIS, Greene (figs. e, f, g).

H. D. House del.

VIOLA NOVAE-ANGLIAE House, sp. nov.

Rhodora

JOURNAL OF

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ALGAE OF THE FLUME.

FRANK S. COLLINS.

ON September 4th of this year, the writer visited "The Flume" in the Franconia region of New Hampshire. The Flume is one of the well known objects of interest of the mountain region of the state, and many readers of RHODORA are doubtless well acquainted with it; but for the benefit of others it may be well to say that it is a narrow passage, perhaps averaging 15 or 20 feet wide, between perpendicular walls of rock, seeming almost of artificial construction, so straight are the walls, and so even the width. A mountain stream rushes down through it but there is a path all the way; sometimes on a shelf of rock, sometimes on planks fastened to the wall. The depth of the cut, for such it probably is, though cut by natural not by human agency, is so great that direct sunlight can seldom reach anything but the uppermost part, and the moisture trickling from above combines with spray from the stream to make an ideal region for algae.

Nearly everywhere the wall is covered with a dark reddish brown coating; specimens of this taken at different points showed that it was practically the same throughout, four species of algae being found in all the specimens, though varying in relative abundance. Every here and there on this coating were found masses of translucent gelatine, colorless, or pale greenish or yellowish; these also seemed to be of uniform character, seven species being found in each specimen examined, but in varying proportions. Both the brownish coating and the gelatine were more abundunt on the southwestern wall than on the northeastern, plainly on account of the smaller amount of light to which the former was exposed. The species composing the brown coating were *Gloeocapsa Magma* (Bréb.) Kütz., giv-

ing the reddish tint; *Stigonema minutum* (Ag.) Hass., *S. hormoides* (Kütz.) Born. & Flah., and *Scytonema ocellatum* (Dillw.) Thuret. *Stigonema hormoides* occurred also in the gelatine, but not the other three species just named; and besides the *Stigonema*, there were *Aphanothece microscopica* Näg., *Plectonema Nostocorum* Bornet, *Calothrix fusca* (Kütz.) Born. & Flah., *Gloeocystis rupestris* (Lyng.) Rab., *G. vesiculosa* Näg., and *Mesotaenium Braunii* DeBy.

Before the mouth of the Flume proper, the stream flows rapidly over a smooth, sloping rock, in the form of a thin sheet rather than a stream in the ordinary sense. All through this sheet were scattered tufts of a bright green filamentous alga which, on subsequent examination, seemed to be a species of *Zygnema*, with filaments 25–28 μ diameter. No fruit being found, specific determination was out of the question. Zygnemas are found in ponds and still waters generally, often forming large loose masses near the bottom where the water is not very deep. The present habitat is certainly an unusual one, and the smooth, unbranched filaments would seem little suited to holding on to the smooth rock.

As an adaptation there had been developed short rhizoidal projections, much in the same way as the *forma polyrhizum* of *Rhizoclonium riparium* (Roth) Harv. attaches itself to surf beaten rocks, while the *forma implexum*, with perfectly simple filaments, is at home in quiet bays, lagoons and ditches. It is curious to note that another marine *Rhizoclonium* of our coast, *R. tortuosum* Kütz., though without rhizoids, resists being swept away by the waves, by means of its densely crisped and twisted fronds, which entangle it with any algae with which it may come in contact.

Beside the species mentioned, there were found on the walls of the Flume, the thin black sheets of *Schizothrix Muelleri* Näg. and in quieter parts of the stream, *Phormidium Retzii* (Ag.) Gomont; on rocks just outside the Flume, *Stigonema mamillosum* Ag.

The only reference heretofore to the algae of this locality that the writer has been able to find, is by Prof. Farlow in Appalachia, Vol. III, p. 232, 1884; the conditions of his visit were unfavorable, and he reports only five species; *Synechococcus aeruginosus* Näg., *Nostoc rupestre* Kütz., *N. muscorum* Ag., *Stigonema ocellatum* (Dillw.) Thuret and *Trentepohlia aurea* (L.) Mart. It is interesting to note that none of these were observed at the present visit. This would seem to imply either that there was more variety at different places along

the wall than was detected by the writer; or that the species occurring here varied from one year to another. In either case, it is probable that a student spending some days here might considerably extend the list.

MALDEN, MASSACHUSETTS.

SCIRPUS VALIDUS AND ALLIES IN THE CHAMPLAIN VALLEY.

EZRA BRAINERD.

THE lucid account of *Scirpus validus* and its two allied species, presented in the April number of RHODORA by Mrs. Agnes Chase, has doubtless led many students of Botany to examine these plants in the field during the past season. The statement that *S. heterochaetus* had been found in New England only at Milton, Vermont, and the fact that *S. occidentalis* had not been seen from Vermont at all, were additional motives for the examination of the bulrushes, that were known to occur abundantly in Lake Champlain. The result of observations at many stations over a stretch of fifty miles is here given.

1. *S. validus* is extremely rare in the waters of the Lake. Only one small colony was seen in a sheltered bay, where it was growing in mucky sand on the border of a marsh. It is, however, abundant along sluggish streams and in small ponds back from the Lake. Its weak stems ill adapt it to withstand the waves of large bodies of water.

2. *S. occidentalis* is the prevailing species in Lake Champlain, covering hundreds of acres. Its strong, pliant stems enable it to grow even in exposed situations. It is found in water, one to three feet deep even in August. This and the matted interwoven condition of the rootstocks make it difficult to secure proper specimens. The plant begins to ripen seeds some six weeks later than does *S. validus*. The "Eastern form," with open panicles, is the usual one in Lake Champlain; but in one colony near Pelot's Bay, North Hero, the spikelets are in congested heads, as figured by Mrs. Chase in Plate 53, cc.

3. *S. heterochaetus* is also common in Lake Champlain, but is found in more sheltered places than *S. occidentalis.* Its stems are much more slender, but equally lithe and strong. A marsh of several acres in Ball's Bay, Ferrisburgh, is almost entirely given up to this species. When I saw it in August the golden fruit was waving in the wind, and it looked like a field of ripened grain. Indeed, I was told by an intelligent camper in this region, that small birds feed extensively on the seeds of these plants in the autumn. *S. heterochaetus* flowers at a date midway between the two other species, and is readily recognized by the color of the spikelets, their ovoid-conical shape, and the three-cleft style.

The pleasure of finding that these two new species were so common in Lake Champlain, was not unmixed with a painful sense of chagrin that for so many years one had been going in and out among these bulrushes without observing their marked specific distinctness.

Middlebury, Vermont.

NEW STATIONS FOR MAINE PLANTS, — II.

Edward B. Chamberlain.

Alnus serrulata, Willd. — In 1898 a large clump of this plant was found in a swamp along the bank of the Pemaquid river in the town of Bristol, Maine. This is the first undoubted station thus far reported from the state, the shrub previously reported as *A. serrulata* being a phase of *A. incana* with rufescent veins. As the locality is two miles or more from any house, and is one that is but rarely visited save for wood cutting in the winter, there seems to be no possibility of the plant having been introduced from farther south.

Antennaria occidentalis, Greene. (*A. Farwellii,* Fernald, not Greene.) — A large patch of this plant was found on a railroad embankment near Cumberland Center, Maine, in 1902, and specimens then collected have been determined by Mr. Fernald. The only other Maine station, at North Berwick, is about forty miles southwest, and has been reported in Rhodora, 1: 152.

Desmodium Dillenii, Darlingt. — Specimens are in my herbarium from Chesterville, Franklin Co., and also from Falmouth, Cumberland Co. The Chesterville station represents the extreme northward extension of the species in western Maine.

Ipomœa hederacea, Jacq.—Collected in 1903 on a roadside dump in Falmouth, where it had escaped from nearby dwellings. This is the first report of the plant's occurrence north of Massachusetts.

Ipomœa purpurea, Lam.— Not unusual on the dumps around Portland, and during the past season spontaneous in vegetable gardens at Cumberland Center. While this plant is not a permanent factor in the state flora, yet its prevalence in cultivation renders it probable that specimens could be found on the waste heaps of most of the large towns in the state, but to my knowledge the plant has not been reported from Maine before.

Oxalis filipes, Small.— Specimens of a peculiar Oxalis were collected in a mowing field in Falmouth in 1903. They were at first determined as *O. stricta*, L., but recently Mr. Fernald has determined them as above. The species is new to the State flora.

Panicum virgatum, L.— An abundance of this species was found by Mr. C. H. Knowlton and the writer at Pine Point, Scarboro, in July, 1903. The plant is of rather southern range in the state, and is not common.

Polygonum tenue, Michx.— In September 1902, while crossing a sandy field at Cumberland Foreside, Miss L. O. Eaton and myself came across a small patch of a plant later determined as *Polygonum tenue*. This is the only station thus far known in the state and forms the basis of the report in Rhodora, 4: 204.

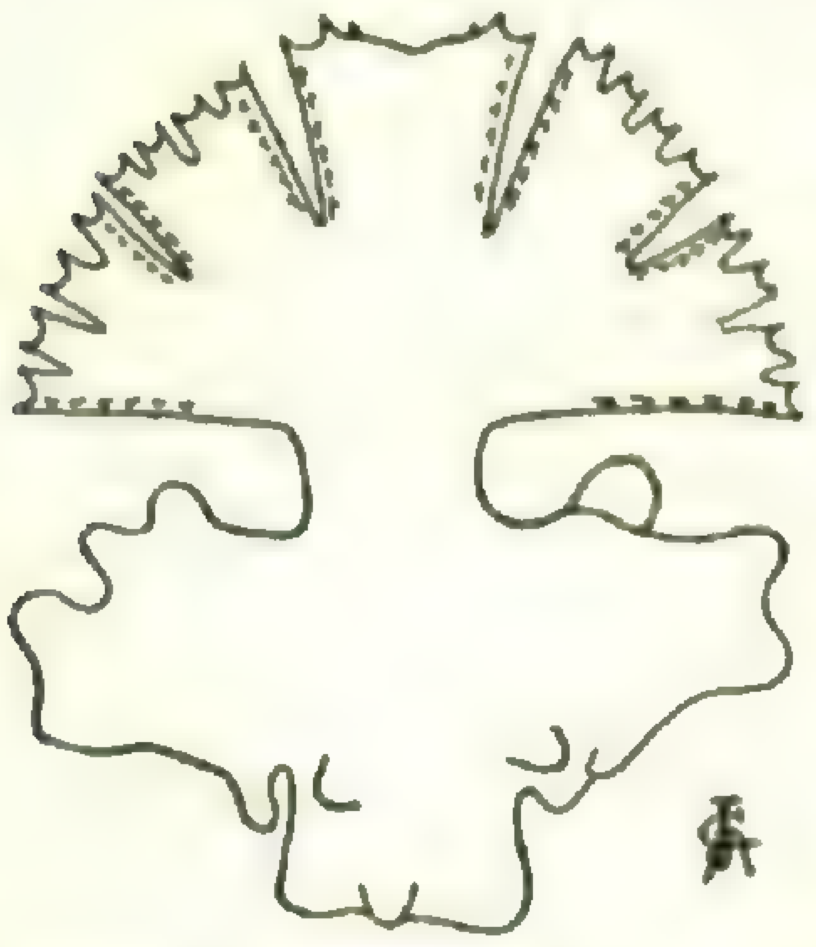
Scirpus sylvaticus, L.— Specimens of this plant, since determined by Mr. Fernald, were collected by Mr. J. Franklin Collins and myself in 1903 near West Falmouth Station in the town of Falmouth. During the past season Dr. D. W. Fellows and I found several plants on Cape Elizabeth near Cape Cottage. Previous reports have not extended its range north of Wells.

Specularia perfoliata, A. DC.— A few plants of this species were found in 1903 at the falls of the Presumpscot river in Falmouth. The plant is of very local distribution in Maine, being known, besides the present station, only from a few points in York Co., and from Mt. Desert Island.

Specimens of all the species mentioned above are in my own herbarium, and with one or two exceptions there are duplicates either in the Gray Herbarium or in the Herbarium of the New England Botanical Club.

Washington, D. C.

Division in Desmids under Pathologic Conditions.— In looking over certain desmid material during the past summer a character was noticed which to my knowledge has not been called to notice in any published paper. It is a well known fact that the microscopic plants, Desmids, Diatoms, and other small or unicellular algae furnish a considerable amount of the food supply of various small fresh water animals. The effect upon the plant cell in such a case is peculiar. In several cases in material obtained from Reading and South Framingham, Massachusetts, there were also in the bottles various Entomostraca, the two genera bearing upon the matter in hand being Daphnia and Cypris. These small crustacea have bivalve shells which are transparent, allowing the food to be seen after it has entered the digestive tract. It was noted that the change was not always immediately fatal to the Desmid that was swallowed. In a number of cases the cell had not only continued to live but had continued to carry on its division. In such cases, however, instead of the newly formed cells being like the old cells as is the usual condition, they appeared as contorted and bizarre forms quite unlike the old semi-cells. This is of course due in some way to the action of the chemical contents of the digestive tract upon the cells of the plants, thus causing truly pathologic conditions. It was noted in three genera, Cosmarium, Euastrum and Micrasterias, that such conditions occurred. The last, of which a figure is given, furnishes perhaps the best example of deviation from the typical form. The end lobe is fairly typical in its general shape but has an additional small lobe on the face. The lateral lobes are not as well marked, being on one side almost entirely fused, on the other less so. In both cases there are various additional smaller lobes. Altogether, if broken away from the old semi-cells, it would never be taken for a semi-cell of *Micrasterias papillifera*, which it nevertheless is. It would be interesting to determine the sort of form that would be produced if these peculiar cells were to divide again. Some clue as to whether or not these cells would exert an influence on the semi-cells derived from them, might perhaps be obtained from actual experimenting.— Joseph A. Cushman, Boston Society of Natural History.



Some Noteworthy Plants of Maine. — On Sept. 7, 1902, a single root of *Solidago asperula*, Desf., with two or three stems was found within the limits of Portland. Apparently it has not persisted, as the locality was visited last year and again this year, but the plant could not be found.

Centaurea nigra, L., is abundant on Long Island in Casco Bay extending over a large area.

Senecio Jacobaea, L., which Judge Churchill found common on Prince Edward Island and working its way southward through the Provinces (Rhodora, iv, 34), was discovered three years ago in the Deering district, and though still growing freely it does not appear to be spreading.

Coronilla varia, L. I collected this summer at South Freeport, where it is thoroughly established, having overrun an old garden lot and extended to the adjacent roadsides. This is probably the third station for this plant in the State.

Allium tricoccum, Ait., abundant on Eagle Island, Casco Bay.

Veronica Chamaedrys, L., has recently been received from Mr. M. H. Briant, West Buxton, who states that it has been growing freely there in grass land for twelve years or more.

Other plants I mention which have been collected in Portland the present season, are: *Thlaspi arvense*, L., *Sisymbrium Sophia*, L., *Saponaria Vaccaria*, L.

I wish also to report *Juncus oronensis*, Fernald from Allaguash River, northern Aroostook, seen by Mr. Fernald in my herbarium. This, as he suggests, establishes an extension of range for this species. — Dana W. Fellows, Portland, Maine.

An Addition to the Fern-flora of Vermont. — *Botrychium Lunaria*, Sw., is new to the listed flora of Vermont. I found a specimen of it at Willoughby Lake last August. It grew in an upland field, at the foot of a high wooded pasture, which extended back to the cliffs. I was looking for *Ophioglossum vulgatum*, L., which I found in abundance, but nearly all had been decapitated by the scythe. In the same field grew also *Botrychium obliquum*, Muhl., and *B. dissectum*, Spreng. I might mention too *Senecio Robbinsii*, Oakes, as a very common plant growing here and in all the fields and pastures round

about. Amid such environment I discovered *Botrychium Lunaria*, Sw. The top of the fruited frond had been cut off by the mowers, but the sterile frond and all the rest of the fern was in perfect condition. No other specimen was found, but a better time to look for it would doubtless be earlier in the season, previous to the ravages of the scythe and the rake. The fern has been identified by Mr. George E. Davenport. —Geo. H. Tilton, Woburn, Mass.

ERRATA.

Page	21,	line 14;	for *C. tinctorium* read *G. tinctorium*.
"	23,	" 15;	" PUBLICATION read PUBLICATIONS.
"	34,	" 30;	" Greenii *read* Greenei.
"	42,	" 19;	" of *read* or.
"	57,	" 5;	" *oblongifolium* read *oblongifolia*.
"	70,	" 9;	" 1–2 mm. *read* 1–2 m.
"	79,	" 30;	" Noauk *read* Noank.
"	80,	" 10;	" Botrichium read Botrychium.
"	91,	" 6;	" Murdock *read* Murdoch.
"	95,	" 2;	" *Caulophyceum* read *Caulophyllum*.
"	97,	" 42;	" corymbosus *read* corymbosa.
"	"	" 43;	" lanceolatus *read* lanceolata.
"	110,	" 19;	" *Sibericum* read *Sibiricum*.
"	114,	" 14;	" Rhapontium read Rhaponticum.
"	121,	" 9;	" *cornicula* read *corniculata*.
"	140,	" 20;	" **Alleghaniensis** read **Allegheniensis**.
"	142,	" 25;	" **Hedoma** read **Hedeoma**.
"	144,	" 1;	" montanum read montanus.
"	145,	" 27;	" *trichomitrion* read *trichomanoides*.
"	151,	" 2;	" XVII *read* XVI.
"	212,	" 2;	" *spinulosum*, var. *concordianum* read *spinulosa*, var. *concordiana*.

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